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GLEANNINGS

IN BEE CULTURE

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GLEANINGS IN BEE CULTURE

A JOURNAL DEVOTED
TO BEES
AND HONEY
AND HOME
INTERESTS.

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THE ADMINISTRATION of railways of Alsace-Lorraine urges its employees to engage in bee-keeping, engages to aid them in starting, and will sow seeds of honey-plants along its lines.—*L'Abeille Alpine*.

TO CLEANSE WAX it is recommended, in *Pfälzer Bienenzeitung*, to boil in salt water, two or three repetitions making it beautifully clear. Wonder if that will work on this side. [We commonly use in this country acid to clarify dirty wax. We have never tried salt, but I presume it would do the work. Will try it.—Ed.]

IN GOERZ AND GRADISKA, Austria, says *Bienen-Vater*, bees can be located less than 33 feet from the highway or the premises of another only when the entrance of the hive is ten feet high, or when a fence, hedge, or other obstacle at least ten feet high obstructs the passage of the bees. Isn't that law liberal enough for anywhere?

WM. W. WHITNEY writes that he has never had paralysis among black bees or hybrids, but has among Italians, and asks whether Italians are more likely than others to be afflicted with paralysis. I've had paralysis among hybrids; I think never among blacks; but then, I haven't had blacks since I had paralysis.

PASTOR FLEISCHMANN says, in *Illustrierte Monatsblätter*, that Prof. Frank Benton first introduced American methods of queen-rearing into Germany. He says W. Wankler, in his pamphlet on queen-rearing, differs from American methods only in emphasizing selection for improvement of stock—a good thing to emphasize anywhere, only proper selection can hardly be made except in connection with honey-production.

C. E. WOODWARD, page 77, is afraid I'll trip him up by saying "there never was and never will be an effect without a cause." I had never thought of doubting that before, friend Woodward; but your fear of being tripped up on it made me look about for exceptions to the rule, and I didn't have to go far. In the next sentence you're "on to me as big as a cart-wheel." Now, I'm sure there's no cause for your seating yourself on me so heavily, so there's an effect without a cause, isn't there?

HEREAFTER, any bee-keeper who gets into a lawsuit can't count on the National to bear more than half the expenses of the same. With all the precedents established by the National, there is some question whether any of its money ought to be spent on lawsuits. It can be spent in better ways. [This is better; and I am not so sure but it would be better still if the amount were limited to a certain small definite sum. I believe the Association should bend its energies to foster better legislation to protect the bee-keeper and to keep down adulteration.—Ed.]

HENRY E. WOEST asks what counteracts the soda in six of the recipes in *Honey Leaflet* that have no sour milk or other acid. I first thought, "Isn't there acid enough in the honey?" but not being sure of the answer, I turned the question over to the women. "Why, soda is often used in baking, without any acid." "In what?" "Oh! in lots of things." "Well, but in what?" They opened at random Marion Harland's "Common Sense in the Household," and, beginning at page 323, showed me five recipes within three pages that had soda but no acid. I gave it up.

HONEY pancakes contributed by Henry E. Woest: 1 pint flour; heaping teaspoonful baking-powder; big pinch salt; $\frac{1}{2}$ pint extracted honey. Mix to a thin batter with water or sweet milk. Sift flour, baking-powder, and salt together, then stir in honey and water or milk. Griddle must not be too hot, or cakes will burn. Part of our family like them, part don't. [I suppose it is ex-

pected, of course, that a nice grade of extracted honey shall be spread on the pancakes to be eaten. We tried this recipe at our house, and we all voted that we had tasted better cakes. They were too *soggy* to suit us. To our notion, the honey on the cakes *after* they are baked makes a better combination.—ED.]

IF YOUR BEES are like Mr. Doolittle's, apt almost all to return to their old home, you may find it best to form nuclei as he describes, page 79. Before taking so much trouble, however, it may be worth while to see whether your bees are not like mine. Merely take frames of brood and bees from any colony that has been *queenless* a day or more, and put them where you want them to stay, adding some extra bees. Mr. Doolittle and I have never been able to come to any understanding as to why our bees act so differently, but I'm telling you about what I've tried hundreds of times. Even bees that are not *queenless* don't leave the hive as badly as his do.

TWELVE BEES were freed simultaneously with twelve pigeons at the same distance from their homes, five kilometers. The first bee beat the first pigeon by a quarter of a minute. Three other bees beat the second pigeon, the remaining bees and pigeons being on an equality.—*Patriote Illustre*. [This is interesting, but I should like to know how long it took the first bee to make those five kilometers; and, further, what would be the average flight of all the bees for that distance? We have commonly said that bees can go a mile a minute; and after seeing these big racing automobiles whizz by, almost at arm's length, at the rate of a mile in 53 seconds, on an oval track, I tell you it is fast time.—ED.]

"BEES, NATURALLY, are not taught, but learn their ways of life by imitating those before them," says Ralph P. Fisher, page 83. If that means merely that they do things in the same way their predecessors have done, there can be no exception to the statement. If it means there's any conscious imitation on the part of the bees, trying to do things as they have seen others do, facts will hardly carry it out. A case was reported in one of the foreign journals in which some bees that by no possibility could have seen comb built by other bees made a perfect job of it the first time trying. [Say, doctor, you ought to label this as a *goak*—as if we had to go clear across the water and hunt over the foreign journals to prove that bees know how to build comb without being taught or seeing others do it!—ED.]

A FIELD-BEE from a diseased colony, returning from the field and entering a wrong hive, will carry the disease into that hive, says C. E. Woodward, page 77. But if it starts out empty, and returns with only nectar from the flowers, can it bring disease? You may remember that M. M. Baldree's cure for foul brood depends on the bees leaving the diseased hive through an escape and returning from the field to a hive

in which there is no disease. [Mr. Woodward's statement is entirely correct. This is the experience in our own yard, which has been demonstrated over and over again; but whether, when the bee starts out empty, and returns only with nectar from flowers, it will bring disease, is something I can not answer. I should be a little afraid of it. It would take more time for a bee to get rid of the germs than a mere flight to the field would take.—ED.]

I LEARN, pages 64 and 83, that at Medina you pick up a hive with hive-hooks, and two men carry it out of the cellar. That will work nicely; but here one man does it just as quickly, and with nothing but his hands. But then my hives have cleats full width of hive. Sometimes two men carry two hives on a handbarrow. A wheelbarrow doesn't work so well where steps go down into the cellar, as here. [Yes, we use hive-hooks, and I might have said that one man with these same hooks can carry in one hive. Where hives are not too heavy, this is the way they are carried in if the bottom-board is loose; but when I spoke about hive-hooks I was talking about hives with loose bottom-boards, and you can, therefore, see it would make no difference whether the cleats were long or short on the hive. The hooks would have to be used just the same or else the bee-keeper would have to bend clear down and reach his fingers under the bottom-board, and pick up hive and all. This is no easy job.—ED.]

BRICK BUTTER is the way you get the best butter here, right in the heart of the noted Elgin dairy region. The grocer wraps up in prepared paper a pound brick, and there you are. Well, I've had a brick of the same kind sent from Medina, only, instead of butter, it's candied honey. It's great—at least for winter trade—ought to increase sales no little. [Brick honey is a new product of the apiary. Until Mr. Aikin kept hammering at the problem of selling candied honey to consumers direct, very little effort was made to sell honey in that form. Now, fortunately, times are changing. The brick and bag honey are finding a certain and positive demand in many quarters; and the more the sale of these is encouraged, the less distrust will there be when liquid honey clouds or turns to a granulated condition. The fact is, beekeepers have for years sought to keep their honey in the liquid condition. Consumers have become educated to honey in that form; and when, perchance, it does cloud or granulate, as it must necessarily do in spite of all that can be done, they are distrustful at once. I believe it is high time we go at the problem from the other side. Show the public that honey in the candied condition is the *natural* state of most honey in winter. Consumers do not know that yet; and because they do not know it they may refuse to buy any more bottled honey because, forsooth, they have a little at home that has "turned to sugar," as they call it.—ED.]



BLACK BEES AND PICKLED BROOD.

In my first experience with pickled brood, some years ago, it was very evident that, the nearer the bees were to blacks, the more severely they were affected. Pure Italians suffered comparatively little, though they were not exempt from the disease. Here there is scarcely any thing but pure Italians, yet the disease is quite prevalent, though never very serious. In all my experience with the disease it has always disappeared entirely during a good honey-flow.

TEMPER OF EXTRA-YELLOW BEES.

Extra-yellow bees appear to have been produced in two ways: First, by careful selection inside of the Italian race; second, by crossing the Italians with the Eastern races, such as the Cyprian and Holy Land. I have had both. The latter were considerably crosser than the average Italians, while some of the former were the gentlest bees I have ever owned. I used to have a colony of these that I was in the habit of handling, for the benefit of visitors, without smoke and without any protection, and I believe I was never stung by them.

BASSWOOD IN TEXAS.

It seems that there are localities in Texas where basswood is abundant. I have been told this by those who have been there and say that there are large tracts of country covered with it. Reports at the Texas convention indicate that it yields honey just as freely as in the Northern States. It appears to be nice honey too. Several years ago some of the Canadians argued that, the further north basswood honey was produced, the better was its quality, and they claimed superiority for their product over that produced in the States on that account. I wonder if the Canucks did not manufacture that theory out of whole cloth. Will some of the Texans tell us more about the quality of their basswood honey? Manufacturers of sections will please take notice that these Texas basswood forests will put off for a while at least the time when there will be no more basswood for sections.

HOFFMAN FRAMES.

The decision of The A. I. Root Co. to abandon the V edge on the Hoffman frame and to make the end-bars of thicker material will go a long way toward remedying some of the worst faults of the frame. The

thicker ends will permit of longer nails, which will make a more substantial frame. More than this, though, it will do away with all the trouble that now arises from putting the parts of the frame together improperly. The ends can not slide past each other, making the combs closer together than they ought to be, as is common with the present styles. This makes them nearer "fool proof," as they can not be nailed up wrong. The edges of the end-bars will not be nearly so likely to split off. Now, if means can be devised to compel the crowding of the frames up close together every time they are separated, and keeping them so at all times, the frame will be pretty nearly all that has been claimed for it by its admirers. For this purpose I think there is nothing so promising as a good spring. Just what this spring should be like will require a little experimenting to determine. I have examined a number of patterns sent me for that purpose. Some of these are all right, except that the proper degree of stiffness will have to be determined by actual trial, after which I shall be ready to report further.

TWO FOLLOWERS FOR HOFFMAN FRAMES.

It is hard for me to tell just what C. E. Woodward is driving at on page 1157. First, one would suppose he was writing about the use of two followers in the brood-chamber, with Hoffman frames, but he follows this up by saying that, "Even in Cuba it would be better to have two followers in comb-honey supers." Now, so far as I know, I have said nothing either for or against the use of two followers in comb-honey supers. Then he says, "Of course, I am speaking of close-fitting followers." Does he mean that the ends of the followers should touch the inside of the hive? He advises me, too, to use a break-joint honey-board to avoid having to pull frames to pieces in getting out the first one. I have used break-joint honey-boards ever since they were invented, and I can not see how they are going to prevent the frames from being fastened together with propolis or with brace-combs, which are all below the upper surface of the top-bar. My only objection to two followers would be the difficulty of keeping the frames in as close contact as can be done with one. If I were using ten-frame hives, I would rather use nine frames and two followers than ten frames, but I would rather use one substantially made follower than two flimsy ones. A correspondent on page 1165, in speaking of two followers, brings up a point in hive-construction that has not been touched on before. He says that, if only one is used, the comb next to the hive "is often pasted to the hive because the space is too small." This is true of the most of the hives in use. I have come across a few hives in which some provision had been made for keeping the first frame a proper distance away from the side of the hive by means of two little cleats nailed on at the proper points: but in nearly all cases the first frame is shoved di-

rectly against the side of the hive, with the result that the comb is either fastened to the side of the hive, or is imperfect, owing to the lack of space. Whether this is the fault of the manufacturers or the one who nailed up the hive, I do not know; but a strip about $\frac{1}{8}$ inch thick should be nailed at each end of the side of the hive for the end-bars of the first frame to bear against.

WOODEN SCREWS FOR FRAME COMPRESSION.

It has been assumed by some that the wooden thumbscrews are unfit for use in a locality subject to dampness, like that of the States near the great lakes, or, for other reasons, in a dry climate like that of Colorado. There are two troubles that operate against the use of screws in bee-hives. The first is, that, unless proper care is taken for its avoidance, moisture, such as that from rains or the general dampness of early spring, will so swell the screw and the wood surrounding it, that it becomes immovable. This is a very real trouble, and in my first experiments with the Heddon hive it came near making me abandon the whole thing in disgust. But the way out of it is very simple. Before being put into use, the screws should be well boiled in tallow or vaseline. Probably paraffine or beeswax would be good, though I have always used tallow, because cheaper and entirely satisfactory. This boiling in tallow ought to be done by the manufacturers of the screws, and none should be sent out without it, as, unless it is done, there is bound to be more or less trouble and dissatisfaction in their use. It is also a good plan to take a brush or swab and saturate thoroughly with hot tallow or vaseline the threads cut in the hive-side. This will make the wood waterproof to a great extent, and the lubricating material will not work out entirely for years. In boiling the screws, care should be taken not to boil them too long nor get them too hot. In fact, I believe the tallow should never really boil, though when the screws are put into it there will be a lively ebullition, caused by the escape of the air in the wood which is replaced by the tallow. If heated too hot, the wood is carbonized and shrunk to an almost incredible extent. I think a piece of dry well-seasoned hard wood can be shrunk in diameter fully one-fifth in this way. The other trouble in using screws is that they will not follow up a shrinkage like springs. I gave them up in comb supers on that account. Sections are seldom thoroughly seasoned unless they have been kept on hand a year or more; and after the screws have been set up against them, they shrink so as to leave every thing loose. They are often swollen more or less, too, from the water used in wetting the joints so they will not break in folding. This trouble of shrinkage does not bother so much with brood-frames, as they should never be made of any thing but thoroughly seasoned wood. At present I prefer the screws for brood and extracting frames and springs for comb-supers, though a more

extended trial of the springs may cause me to change my mind. For reasons I have already given, I think springs are likely to suit the average bee-keeper better.

INTERCHANGEABILITY OF BROOD AND EXTRACTING FRAMES.

Some of those who use the Hoffman frame for extracting, putting seven frames in an eight-frame super, or nine in a ten-frame, defend their course on the ground that it is desirable to have frames that are interchangeable between super and brood-chamber. I could never see any great advantage in this, and for many years there has been practically no interchanging in my apiaries. I do not want brood in my extracting-combs, and there is seldom any reason for putting extracting-combs in the brood-chamber, the only time when it is really desirable being when there is a shortage of honey in the brood-chamber which might be remedied by full extracting-combs. It is so seldom that this condition can not be avoided or overcome just as well in some other way that it is not of much importance. Extracting-combs, especially if old ones, generally require considerable reconstruction before the queen will lay in them, unless she is very anxious for laying room. I aim to have plenty of extracting-combs at all times, and I want to have them at all times available for that purpose. My system of management tends toward an accumulation of brood-combs. This tendency I overcome by sorting out the poorest of them and transferring them into extracting-frames. At least 95 per cent of my extracting-combs are transferred brood-combs; but once they are turned over to the extracting department, they are used for nothing else.

Brood in the extracting-frames is a nuisance. When large quantities of unsealed brood are thrown out with the honey, as is sometimes the case, the quality of the honey may be perceptibly injured, to say nothing of the loss of the brood and the fact that people of nice sensibilities do not like the idea of having worms mixed with their food, even if they are strained out again. A more serious objection is the pollen which is almost always present in brood-combs, and which usually mixes more or less with the honey extracted from them. Some kinds of pollen are much worse than others in this respect, and it is impossible to extract honey from combs containing them without a large admixture of pollen. No honey is improved by having pollen mixed with it, and in some cases the quality is very materially damaged, as the pollen gives the honey a strong and unpleasant flavor besides darkening it somewhat and making it turbid and cloudy.

The late lamented Dr. A. B. Mason made some experiments which he claimed proved that honey extracted some of the color from old brood-combs, and various others have claimed that they could not produce the finest, whitest honey, such as they wanted

for exhibition purposes, from combs that had contained brood. While many of us can testify that brood-comb that has been repeatedly extracted from does not color the honey in the least, it is quite probable that the first time honey is extracted from a comb that has contained brood it is both colored and flavored to a slight extent. This is, perhaps, but a small matter; yet I have known people who were prejudiced against extracted honey on account of it, and no doubt there would be more of them if the facts of the case were generally known.



I don't know that I can devote my space in this issue to any better advantage than to copy entire Mr. G. W. York's article on advertising and selling honey, read at the St. Louis convention.

When the Secretary, Mr. Brodbeck, who, unfortunately, can not be here, wrote me saying that he wished me to write a paper and to select my own subject I rather declined because I had been on the program so often. However, he insisted on it, and I suggested the subject of "Advertising and Selling Honey," and so I have prepared this paper on that subject.

Advertising, in these latter days, has become almost a science as well as an art. To the business man who hopes to be successful, advertising is a necessity. While in some instances it is rather expensive, it must be indulged in, and that liberally and constantly.

Advertising as applied to honey as a table article has never been attempted in more than an occasional and very limited way. There has been no systematic, businesslike application of modern methods of acquainting the consuming public with the value of honey as a daily food. Its medicinal, health-giving, and health-keeping qualities are also less known than they should be. But just how to initiate a propaganda of advertising that shall interest consumers in honey in a manner mutually helpful is a great question. However I might desire to be the modern Moses to lead you through this wilderness into the Promised Land, I feel I shall fall far short of attaining such coveted honor. But there must always be a beginning, and some one who shall start; and I may as well be the one who attempts to blaze the way, even though I fail to reach the desired goal of success.

In the first place, no plan of advertising honey that would promise results can be inaugurated without the expenditure of cold cash—yes, and lots of it. It takes capital nowadays to do things—to accomplish objects worthy our civilization and people.

In my humble opinion, the National Bee-keepers' Association can undertake and continue an advertising campaign to increase the general demand for honey better than any other organization, firm, or individual. The Association stands for all beedom. What it does should be in the interest of every one who produces honey, and not alone for the benefit of its members. We need to get rid of a whole lot of the selfishness that seems to be on board in some quarters. Only he lives truly, or in the highest sense, who helps to make the pathway easier and brighter for others. No one liveth unto himself, no matter how much he thinks he desires so to do. We are all dependent upon our neighbors, whether we realize it or not. And so in advertising honey it will benefit all producers as well as consumers.

I have believed for many years that the reason why the price of honey is so low is because of the unequal distribution and underconsumption. I know some think that the trouble is overproduction and stagnation of the principal markets. But once let the dear public know—or be assured—that they can get the pure honey

every time they buy, and also impress upon them its great value as a food, and there wouldn't be enough honey produced in all the world to supply a quarter of the people, and at a good price.

I know there are a few among us who are advising bee-keepers to "keep more bees." I suppose one idea is to keep more bees, to produce more honey, so as to buy more bees and bee-supplies, and then keep more bees to produce more honey, etc. My theory is, to advertise the uses of honey so that what is now produced will bring a higher price. Then if a bee-keeper decides to keep more bees to produce more honey he will also get a great deal more money for his crop, and so be better paid for his labor, and receive better returns for the capital invested. I doubt not more rapid progress will be made if the advertising line be followed for a while, than to attempt to keep more bees so as to increase the flood of honey to be sold at a bargain-counter price. Why, honey should bring at least 50 per cent more per pound in the markets to-day than it does. But the demand must be increased in some way. My "some way" is by advertising—letting the people know the truth about honey.

Again, the untrue statement that comb honey is manufactured—which was started in 1881—still goes "marching on," and is yet dealing its dreadful death-blows to the honey business. I believe the only way ever to "nail that lie" is for our National Bee-keepers' Association to advertise—give the people facts about honey for awhile. Very soon, I am sure, the newspapers would "catch on" and the good work started through such advertising would be kept going, so that in a few years the evil effects of that misrepresentation about comb honey would be counteracted; and when that happy day is here, there will not be enough honey produced to supply a tenth part of the demand, and at good paying prices to the bee-keeper.

Further, I would have our National Association urge bee-keepers everywhere to endeavor to get their local newspapers to publish information about honey. The Association could prepare such matter, and begin by getting its members to use their influence to have it published as widely as possible. Then the bee-papers would undoubtedly do all they could to have their subscribers do likewise. With such united effort, who doubts that a great demand would soon be created for honey—a demand that would take every pound of honey produced, and at a good price?

The satisfactory selling of honey that will naturally follow the proper advertising of the same, presupposes a high-grade article and suitable retail packages. Of course, comb honey will ever be retailed by the single comb. Extracted honey, whether in liquid or granulated form, must be in convenient-sized packages. And all, whether comb or extracted, should bear the brand or stamp of absolute purity, and that in such a manner as to imply an undoubted guarantee of the same. Once get it drilled into the heads of consumers that there is no such thing as machine-made comb honey, and that the purity of the extracted article can be relied upon implicitly—then there need be no further worry as to profitable prices, or as to finding an outlet for your crops of honey, no matter how large in quantity they may be.

It is possible that a final and satisfactory solution of the advertising of honey by the National Association may include an Association brand. But I imagine a snag will be struck here that, if not properly safeguarded, may cause more trouble than benefit. I am not clear as to the Association-brand business. It might be a good thing. I don't know. Perhaps a careful, competent committee to pass upon granting permits after examination of the credentials of an applicant would be the best way to do it. But as there is no uniformity of grading on the part of producers, and no very universal agreement as to taste or honey-flavors, this whole matter of an Association brand becomes a very complex one. Of course, the assembled wisdom of this body may evolve something tangible and adequate out of the chaotic condition that exists. If so, we can swing our hats high with huzzas of victory. But let us make haste slowly in this matter, lest our latter end be worse than the first.

In conclusion, I want to urge a thorough discussion of the advertising of honey. It is worthy the best brain in our ranks. It is also entitled to a fair trial, I think, provided the Association's funds will warrant it. But I have no doubt many who deal in honey would be glad to co-operate, and surely every commercial honey-dealer in the land will be only too eager to lend a hand—and also pay a few dollars annually—in order to get the honey-advertising campaign properly launched; for its beneficial results will be to all who have, for marketing, either few or many pounds of the sweet product of the bees.



THE New York bee institutes will be reported in our next issue.

MR. O. L. HERSHISER has written an article showing that his bottom-board is not affected by propolis attachments as suggested in the editor's footnote in our last issue. It will appear in our Feb. 15th number.

PRESERVATIVES NOT ALLOWED FOR PREVENTING GRANULATION.

DEALERS over the country should understand that putting small quantities of preservatives such as salicylic or phosphoric acid or even glycerine in honey to keep it from candying will, in all probability, cause it to be classed by chemists and food commissioners as adulterated, and subject the seller of such goods to a fine. One such case occurred this summer, where a dealer put a small quantity of phosphoric acid in honey—not to adulterate it, he said, but to keep it in a liquid condition. Whether it would or not I do not know, but the pure-food commissioner got hold of a sample of this, had it analyzed, and the dealer was notified to discontinue the sale of all such honey, which he did. If preservatives were permitted for the purpose of preventing granulation this might open the door wide to fraud; and it is well, perhaps, that the commissioners and chemists should declare that all such honeys be classed as adulterated.

MANUFACTURED (?) COMB HONEY WANTED.

A SHORT time ago Mr. Walter S. Pouder, of Indianapolis, received a letter which he thought was rather a joke on him. It was nothing more nor less than an inquiry for prices on machine-manufactured comb honey. Mr. Pouder referred this to us; and my reply, with the address and all, is given as per below:

Mr. C. A. Cook, Fairmount, Ind.—Dear Sir:—Your letter of Oct. 20, to Walter S. Pouder, making inquiry for artificial comb honey, supposing him to be a manufacturer, has been referred to us at Medina, for Mr. Pouder is one of our agents who sells our bee-keepers' supplies. You have been misinformed as to the existence of this product on the market—namely, machine-made artificial comb honey. There is no such article for sale, never has been, and never will be. We enclose you one of our thousand-dollar reward cards that we have had out for over fifteen years. We have sent it broadcast over the country, and the exact language of it has been copied in a number of the large daily papers, but never have we had any one who would presume to take up with the terms of the offer. Likewise, the National Bee-keepers' Association, an organization of 2000 members, has offered a thousand dollars for proof of the existence of machine-made comb honey, which offer has also been published widely without a taker. The *La-*

dies' Home Journal recently published an item to the effect that there might be such manufactured comb honey. Several other magazines gave currency to similar stories; but every one of them, with scarcely an exception, has published a retraction when the facts were laid before them.

We can furnish you regular bee-comb honey in any quantity. If you make known your exact requirements we shall be glad to give you prices and particulars.

Yours truly,

THE A. I. ROOT CO.,
per E. R. ROOT.

Mr. Pouder thought it was hardly worth noticing; but I should like to get hold of all such inquirers, and give them a good solid dose of facts.

OUTDOOR FEEDING; WHEN IT SHOULD AND SHOULD NOT BE PRACTICED.

IN this issue, page 132, Mr. Doolittle mentions some of the disadvantages of outdoor feeding. Taking it all in all, he advises the beginner to let it alone. In this I entirely agree with him. I also agree with him that it should not be practiced in the spring when the weather is a little cool. As to some of the other difficulties, I can only say that, only a year or so ago, I would have written myself just as Mr. Doolittle does. My first experience in outdoor feeding was decidedly unfavorable; but later experience on a more extended scale showed me that the difficulties were not nearly as great as I had expected. For the queen-breeder I consider it the greatest boon that has yet been offered; for by careful management the bee-keeper can bring about artificial conditions very much like a natural honey-flow, when cell cups will be accepted, built out, queens introduced and mated; and as to robbing and getting weak colonies or nuclei robbed out, there is not a particle of need of it. None of our bees stood the outdoor feeding better than those in our baby nuclei, and we had a lot of them. It is true, as Mr. Doolittle says, some colonies will get more than they need. No harm in that, for the colonies that have too much can spare surplus combs to those that do not have enough. It is simply a matter of equalizing stores on the part of the bee-keeper. As Mr. Doolittle is a queen-breeder himself, I strongly urge him, if there are not other bees in his immediate locality, to try the plan out again, being careful to observe all the hints that have been given by the different writers on the subject within the last six months.

THE MINNESOTA BEE-KEEPERS' CONVENTION.

A MEETING of the State Bee-keepers' Association was held at Minneapolis on Thursday and Friday, Dec. 7 and 8, 1904. I had intended to get in a mention before this; but the reports of other conventions of a prior date crowded it out until now. In the mean time I wrote to the Secretary for a report of the meeting, but have not heard from her at the present time.

The convention was called to order by Dr. E. K. Jacques, of Robbinsdale, who proved to be an excellent presiding officer, and just

the man for the place, in view of the fact that there was an "irrepressible conflict" which was bound to come to a head at some one of the sessions. The question at issue was whether the State Association, at the previous meeting, indorsed or fathered the movement that had already been put into operation along the lines of co-operation. One side took the view that the Association was a party to the movement, had appointed the committee, and was, therefore, a co-operative body to handle honey and sell supplies. President Jacques held that the committee on co-operation had no organic connection with the State Bee-keepers' Association, that he did not so understand it at the time the committee was named. This view was supported by the minutes of the Secretary, Mrs. W. S. Wingate, of Minneapolis. A small but active minority insisted that the committee was appointed by the chair for the Association. The discussion waxed rather warm, when finally, on a test vote, the Secretary's minutes were sustained. The minority was still strenuous in urging the State Association to stand for co-operation. After a long discussion, by an almost unanimous vote it was decided that the organization could not, as incorporated, have any thing to do with a commercial enterprise. At the close, Dr. Jacques made a most conciliatory speech that resulted in harmony and good feeling all around, although, like Banquo's ghost, the subject of co-operation, I should judge, is one that will not down, but probably come up in some form at a future meeting.

The Association took strong grounds in favor of foul-brood legislation for Minnesota. It was shown there was an urgent need of such a law. An excellent committee was appointed, and the probabilities are that a strong effort will be made to get a law through at the present session of the General Assembly of Minnesota. Editors York and Root both volunteered to help along the movement in any way that seemed feasible.

At the evening session, on Wednesday, there was some moving-picture stereopticon work by Prof. F. L. Washburn, State Entomologist, and E. R. Root, of Medina. Prof. Washburn showed some beautiful colored slides, not only relating to bee-keeping but to his special department, entomology.

On the same evening, Mr. Wm. Russell, of Minnehaha Park, a native-born Scotchman, gave a bagpipe selection. It was encored most vigorously. He was dressed in his native costume, and rendered his music in the characteristic fashion of the native Highlanders. At the close of this, little Miss Jessie Baker, a girl nine or ten years old, dressed in Scotch costume, gave a Scotch dance while her father played the bagpipe. So well did she do her work that she was repeatedly called back by the audience.

Quite a number of interesting papers were read at this meeting; but as I was able to be present at only a few of the sessions I am not able to present them here, but may do so later on.

LIVE BEES ON THE SCREEN; MOVING-PICTURE WORK.

It is not often that I give any comment on my own convention work in these columns; but our readers may be interested in seeing what Bros. Hutchinson and York have to say about the moving-picture work at one or two of the late conventions, especially as there are ideas there that may be helpful to other exhibitors and bee-keepers who desire to illustrate bee-keeping in its various phases before the public schools. Well, here is what is said. We will first quote from Mr. Hutchinson, of the *Review*:

A delightful entertainment was furnished by E. R. Root at the meeting of the Chicago Northwestern Beekeepers' Association. It was a series of stereopticon views, together with moving pictures showing the swarming and hiving of bees, as well as some of the manipulations of handling hives. When the operator jerked back his hand and rubbed the back of it on his pants leg there was a decidedly audible snicker from the audience. At the close of the entertainment, live bees, placed between two glass slides, were placed in the lantern. In catching the bees and putting them between the glass slides, some of the bees lost their stings, to the sorrow of the operator. The sting remained attached to one bee (not being pulled entirely loose), and the way the bees chased this one, and tried to remove the sting, brought down the house. The pictures of the bees on the screen were about two feet in length.

This is what Mr. York, of the *American Bee Journal*, has to say:

Mr. Ernest R. Root is a versatile man. He can do many different things, and do them all well. His latest attempt is the management of a kinetoscope, by which moving pictures are thrown on the screen—pictures in which every motion is shown just as if the very pictured thing itself were in actual operation before your eyes.

For instance, the hiving of bees, looking for the queen in a colony, and, in fact, every motion made in the manipulation of a hive and colony, or the hiving of a swarm, is presented in perfect life-likeness. This was the very interesting feature of the Wednesday-evening session of the recent Chicago-Northwestern convention. The hall was crowded, and the whole performance was greatly enjoyed by all.

This was the first appearance of moving bee-pictures in the United States. They were of English manufacture, and so were of English hives and English methods and manipulations. The usual quick action of the apian operator as the result of a bee-sting was fully appreciated by the duly initiated observers. As an experiment, live bees were caged between a double glass and also reflected on the screen. The way the shadows of these bees scurried around was certainly surprising as well as amusing.

In addition to the kinetoscopic exhibition, Mr. Root also gave a stereoscopic display, showing various pictures of the factory and apiary of The A. I. Root Co., besides portraits of many prominent bee-folks, apiaries, parts of the bee—such as the tongue, eyes, sting, etc., and many other pictures "too numerous to mention."

Mr. Root is a great entertainer with his stationary-and-moving-picture exhibition. He has given the same show both at the Cincinnati and Minneapolis conventions since the Chicago-Northwestern meeting. Don't fail to witness it if you can possibly attend any convention or other place where it may be given.

Mr. W. F. Marks, of Clifton Springs, N. Y., says he suggested to me a number of years ago the possibility of showing live bees on a screen in the manner described above; but I had forgotten all about it, in the same way that I sometimes forget other good ideas given me by my friends. In the present case, at least, it was the Rev. D. E. Lyon, of Matawan, N. J., who put me on track of this method of showing living bees on the screen. Where Mr. Lyon may have gotten the idea I do not know; but I am told that this principle of showing insects in general has been known to practical stere-

opticon-operators a long time. It has not, to my knowledge, been employed to show live bees in this country until lately. The great difficulty is to get the bees to *perform* properly. At Chicago they showed off as if they *knew* they were on exhibition. It seems Mr. France, in putting the live bees into the glass cage, was stung by several of the bees. Some of the stings were lost entirely, and others were only partially torn loose from the bees. As noted by Mr. Hutchinson, the other bees seemed to be very much disturbed by the fact that their mates had lost their stings, and proceeded to "fix them up" by pulling away the torn tissue protruding from the end of the abdomen of the bees. One bee in particular must have gotten a dose of the bee-sting poison, for it immediately began to rub its eyes and nose with its fore legs, and seemed to be in great distress. Its peculiar antics on the screen were comical in the extreme.

It is the intention of the Root Co. to show not only live bees in the manner described, but actual moving pictures by the latest model of the Edison kinetoscope at other places. A series of exhibitions has just closed at the bee institutes in York State, H. H. Root doing the operating, and Mr. N. E. France the talking. So far as I can learn, these took well. Another series of exhibitions will be given in the Eastern States by Rev. D. E. Lyon, before alluded to. These will all be free, the Root Co. being satisfied to take its chances on returns through the distribution of printed matter which is given out at the close of each lecture. Public schools, farmers' institutes, and bee conventions, when the distance is not too great, may secure the entertainment by writing Mr. Lyon. Many dates have already been booked, and in some cases we may not be able to give the exhibition, because there is only a limited number of dates available.

WALTER S. POWDER, THE INVENTOR, BEE-KEEPER, AND SUPPLY-DEALER.

MR. POWDER'S name is one that has come to be a household word in almost every bee-keeper's family in the land. He has sold bee-keepers' supplies at Indianapolis since 1889; but his experience with bees goes back to 1877. In 1884 he brought out a form of bee-escape on the flood-gate principle, that came very near being a perfect device; and even to-day, were it not for a little difficulty in the matter of propolis interfering in its operation, it would be a close competitor and a strong rival of the Porter. But it shows that Mr. Powder, as long ago as 1884, saw the need of a bee-escape. If the times had been ripe for Mr. Powder's invention then, as they were later on for the Porter, it probably would have had a large sale.

Again, we find him considerably ahead of the times when he brought out his open-corner section, which is really a close cousin to what is called the plain section. This he brought out in 1888. Strange we did not ap-

preciate and understand its value away back in those early days. I am of the opinion he could have had it patented, and it would have had a large sale if it had been properly pushed.

Later on, Mr. Powder developed one of the most successful methods of bottling honey that was ever devised. I refer to the plan which we have adopted, of pouring cold honey into the bottles from the filling-tank, then heating the same in a vat of hot water, the water reaching up to within one inch of the top of the jar. When the proper temperature is reached, the bottles are taken out and sealed. A feature of his plan that is valuable is that it enables one to reliquefy the honey in these same bottles. Indeed, we even go further and heat the bottles in a bath of hot air, so to speak, without using any water at all. The honey can be reliquefied without even disturbing the labels or corks. I believe Mr. Powder is using practically the same method.

In 1882 he came to work for the Root Co., taking a clerical position in our office. Later on he struck out for himself, and the next thing we knew he was selling bee-keepers' supplies in Indianapolis. He is now located in a new store, large and well lighted, where he is prepared to serve his patrons with honey in all its various forms, and bee-supplies. But the supply business is liable to be quite dull in mid-winter, and then there is a rush in warm weather. To take up his time in the off part of the year, Mr. Powder puts up a superfine grade of peanut butter. The members of the Root Co. have all sampled the goods, and consider them to be the very finest. If any of our subscribers wish to get a really fine gilt-edged article they should write to our friend Mr. Powder.

As a dealer in supplies, I doubt if there is another man in all the country who has given more prompt service or more general satisfaction to his customers. I will go further, and say that, in all the years that Mr. Powder has been identified with the trade, he has never, so far as I know, had a dissatisfied customer, and that is saying a good deal when we consider that some people are very hard to please.

The little half-tone plate is a very good likeness; and when I learned that our friend was living in "single blessedness" I was much surprised. Good-looking, honest, and an excellent business man, he ought to follow the example of our friend Mr. Wilson, whose picture we showed on page 72 of our preceding issue. Mr. Powder is hereby authorized to secure the pictures, and we will pay the bill. Perhaps I had better be careful. A certain young lady of very prepossessing appearance whose picture I showed in GLEANINGS—well, I will not say when—received several direct proposals of marriage. Perhaps—perhaps—well, perhaps I had better not tell the rest. The young lady's hand had already been taken, and it is possible that friend Powder's may be also, for I conveyed to him, when I last visited him, A. I. R.'s advice.



INTRODUCING.

Scent of Bees; does it Affect the Introduction of Queens?

BY ARTHUR C. MILLER.

In GLEANINGS for Sept. 15, p. 886, I find an editorial headed "Introducing with the old queen in the hive; scent of bees." The matter which follows this heading tells us of having the new queen caged in the hive, and leaving "the old queen to lay right along up to within a few hours of the time when the new queen is to be released" (my italics). Why waste those hours? The success of this method is attributed to the new queen having acquired the scent of the colony. It seems to me that it is time bee-keepers knew something tangible about this matter of scent if so important and so frequent an operation as queen-introduction depends upon it.

Is scent a personal body emanation, or is it acquired by external contamination? Can a bee or a queen in a few hours or a few days acquire from the atmosphere an odor sufficient to overcome her individual body odor? If scent plays so important a part in bee-life, why is a super full of bees readily accepted by a colony to which it is transferred? and why are these same transferred bees permitted to go with stores from their new home back to their old home to be welcomed there, and to keep up this travel to and fro for an indefinite period? And they do just that thing. Mr. F. B. Simpson first called my attention to this, and I have since proved it many times. If scent is the factor of acceptance or rejection, why are bees permitted to enter freely the hives of transposed colonies? If scent governs, why can drones enter anywhere unchallenged?

In regard to drone and queen odors, sexual odors are one thing while colony odors are another. In the case of a queen it is currently assumed that she has a home odor, and that it is necessary to remove, hive, or submerge that and substitute therefor another odor (that of the receiving colony before releasing the queen, on the ground that otherwise the receiving bees will detect the alien by her home odor. The point that the editor makes is, that it is *alien odor* to which the bees are antagonistic. Yet a drone, just as much saturated with home odor, is, under most conditions, received without question by any colony. Also under several conditions worker bees, full or empty, and presumably thoroughly soaked with their home odor, go freely in and out of alien colonies,

and this often, also, in times of scarcity, when, as a rule, all callers are challenged and closely scrutinized.

From experiments and practice extending over sixteen years on this very matter of scent in queen-introduction, I am satisfied that it plays but a very indirect part.

In 1887 Mr. Simmins' book appeared, and it contained his method of "direct introduction" of queens. As described by him the queen was to be kept alone, warm and without food, for thirty minutes, when she was to be run in at the top of the hive of a colony (which *knew* of its queenlessness), and preceded and followed by a puff of smoke. This operation was, preferably, to be done near nightfall. Further, he advised using a fresh receptacle for each queen, or thoroughly scalding the other before using it again.

This method, conducted as described, is good, but I have found that several factors can be ignored and yet uniformly successful results be achieved. I have found that I can use the same cage for an indefinite period, and cage a new queen immediately on releasing another; that I can run in the queens at any hour of the day; that I can introduce the new queen *immediately* on removing the old one; and if the new queen is taken from her work in a nearby hive I shall find her laying in her new home inside of half an hour. I have found this method equally applicable to queens from the mails as to those from my own hives; also in ten instances this last spring I successfully introduced virgins received by mail, and this to colonies some of which had not been de-queened an hour. *Where was the scent factor?*

For many years I have been thus introducing fertile queens; and, except in cases where I have varied conditions for the purpose of study, I have been uniformly successful. To just a very small extent I can see that scent may have some bearing, in that it possibly acquaints the queen of the fact that she is in a strange place, and so cause fear unless that is overborne by hunger. Most bee-keepers are familiar with the ease with which a queen in the full exercise of her powers may be transferred from one colony to another. If, however, such a queen is frightened, trouble is sure to ensue, scent or no scent. Here is the description of a very pretty example of the effects of timidity and subsequent fasting:

To a colony queenless for a few days I tried to give a laying queen from the next colony by just picking her up and letting her run in at the top of the new home. It frightened her, and she started on the run across the tops of the frames, and immediately the bees gave chase and balled her. I rescued and caged her, and let her fast for half an hour, returned to the same hive, removed the cover, and watched her pass in and beg for food. There was no trouble at all then, and she was in full swing the next day. This was an exceptionally timid queen, one that would always run and hide

when her hive was opened. I have had similar cases. Such queens are often balled and killed by their own bees, while one of a more phlegmatic temperament is left undisturbed, no matter how much we may overhaul her colony.

With this free-and-easy way of introduction there are a few factors besides fasting which I generally observe, though they are not always necessary. When introducing a queen to a colony *just* dequeened I usually give them several vigorous puffs of smoke from above and below; and as soon as it has blown aside I let the new queen run in. If the new queen has been caged for several days so she has stopped egg-production, or if she is timid, I do not ordinarily disturb the colony for two or three days after her introduction; but if she is just from one of my own hives I can look her up within an hour or less if I so wish. If it is at a season of scarcity of nectar, or there has been any robbing, in introducing I use rather more smoke "to take the fight out of the bees." I use this method on colonies queenless for any period from one minute to the stage of acute laying workers.

I have been studying these latter curiosities a good deal, and have had many opportunities to test queen-introduction to them, and so far have met with no failures by the direct system. Can this be said of any caging method?

It is a reasonable *supposition* that each colony has its individual odor, but we have no positive proof of it. Because a bee is challenged in trying to enter a strange hive, it is no proof it is on account of odor. It is a fair presumption that such is the cause, but it is not proof. The only act approaching proof of body scent is that of bees searching over objects with which queens have recently been in contact. But this is sex odor. We can do many things which, if "home odor" existed, or if existing was of vital import, we should not be able to do.

Basing practice on theories which ignore odor, I can do the same things which the editor does by other methods. If current belief is right I should fail often, but I don't; while, on the contrary, methods based on the odor theory are far from being uniformly successful. Further, if odor is the controlling factor, why will confined bees receive any queen without previous caging? If we stop to analyze our reasons for following the caging systems (and many others for that matter) they will be found to be based on "follow the leader." It was advised years ago, and has been passed down the line ever since.

As I have studied bee-books ancient and modern I have been astonished at the many beliefs and practices which have come to us from early times solely because each author has, without question, copied from a previous one.

Our methods of education lead us to accept as authoritative whatever we read in books, and it is hard to break from this habit. One of the first things taught in

many advanced schools of to-day is to doubt the text-books until the student has proved the statements for himself. This attitude is not the one common to beedom; but until it is we must expect to continue to advance in circles. It is to try to break such a circle that I have challenged the editor's position on caging. It is his position as representative of bee-keepers at large.

If my position in the matter of odor is wrong I shall be glad to have it shown me; but I shall need more convincing proof than any that has yet been offered. Let us have exact facts, not beliefs.

Providence, R. I., Oct. 24.

[I will explain to our readers that what I said in reference to the matter of scent in its relation to the general subject of queen introduction was based largely on data and information received from Dr. E. F. Phillips, of the University of Pennsylvania, from Geo. W. Phillips, now a student at Denison University, this State, and E. T. Abbott, of St. Joseph, Mo. Dr. E. F. Phillips has spent two summers with us, making the scientific side of bees his special study. Mr. G. W. Phillips, no relative of the former, was born in Jamaica, and has raised many thousands of queens, both in Jamaica and here. He has large apiaries of his own in Jamaica, and while in Medina had charge of the Root Co.'s queen-rearing business. The experience of both the Phillips is confirmed by my own experience in several seasons in queen-rearing a few years ago. I can only believe that, if our friend Mr. Miller had had a long experience in rearing queens in a *large way*, he would probably modify several of his conclusions or otherwise interpret the phenomenon mentioned. As Mr. G. W. Phillips has gone over this scent question thoroughly for several years, I asked him to reply in detail, which he has done.—ED.]

WHY SCENT IS AN IMPORTANT FACTOR IN QUEEN-INTRODUCTION.

No one need be afraid of truth, even if it conflicts with orthodox beliefs. Mr. Miller is correct in a few of his assertions. But while I admit some of his statements to be facts. I can not agree with the conclusions he endeavors to deduce from them.

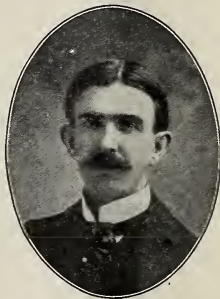
Mr. Miller seems to take it for granted that we believe scent to be the only factor worth consideration in introducing queens. Oh, no! There are many other conditions that play an active part in this matter, and, like him, we know that queens may be accepted or rejected, "smell or no smell." So, we are not surprised that, where every thing is exactly right, a queen may be allowed to crawl over to the combs of some other colony not long queenless; or that bees confined for less than five hours (not much after that time), and while still in a state of excitement, may accept a strange queen; or that bees sufficiently deluged with smoke to "take the fight out of them" should make no resistance when a strange mother is given—no more so, indeed, than we are to understand that a desperately queenless

colony will often accept any thing in the shape of a queen, however given, and irrespective of her actions when introduced. The fact is, other elements exist in a sufficient degree to counterbalance the smell element.

But scent does exist; and the part it plays in apiculture has not been exaggerated. Mr. Miller has cited a few exceptions to prove his theory; but what is he going to do with the general rules? Drones can not be taken into account, for we know that, during swarming season, the bees have a certain affinity for them; and even after, particular colonies, such as supersedure and queenless colonies, will readily accept them, while their own colonies will not tolerate them. If supers of honey, with the bees they contain, may be safely transferred from one hive to another, we should not forget that most of the super bees would be young, and also full of honey—two conditions that tend greatly to reduce the danger of a fight. (But would there always be perfect peace?) Under "several conditions" worker bees will be allowed to unite with strange colonies. Yes, but it is the existence of these peculiar conditions that renders the amicable union possible; and without them the rule holds and the bees are killed. As for saying that bees will be allowed to go in and out of a normal colony unchallenged, and keep on removing stores contained therein for an "indefinite period," I beg to suggest that Mr. Miller try the experiment again.

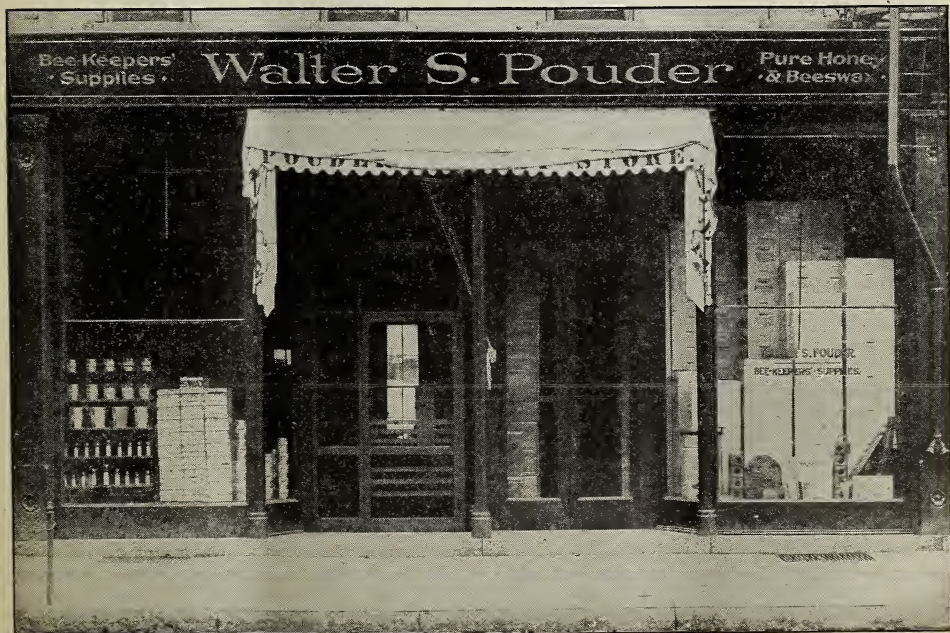
Place a queen in her shipping-cage and supply attendants from her own colony.

Every thing goes smoothly. Take the attendants from some other hive, and you must be careful to have a smoker handy or your queen may be stung to death. Why the difference? Go to two colonies and interchange queens. What happens? Both are killed. Excitement, says Mr. Miller. Take the queen from colony No. 1 by her wings; clip her and let her fall into No. 2. She is balled at once. Excitement, says Mr. Miller. All right. Do the same thing,



WALTER S. POWDER.

and let her fall into No. 1. She is just as much excited, but is kindly treated. Why the difference? Give each of the above-mentioned colonies a frame with adhering bees from the other. Use no smoke, but do the work so gently that the bees are not aware of the exchange. Look at the entrances fifteen minutes later, and see the result. If excitement has been the cause of



SUPPLY-HOUSE OF WALTER S. POWDER, INDIANAPOLIS, IND. SEE EDITORIAL.

this fight, why has there been excitement? Ought not the bees to have been just as much excited had they been removed and replaced in their own hive? They were roused to hostility because they knew they were among aliens. Certainly; but how did they happen to discover they were among aliens? If not by smell, is Mr. Miller prepared to tell us that it was by sight? And if not by sight, will he tell us by which of the other senses the bees recognized their neighbors?

The scent of a queen is certainly affected by foreign odors. I remember once removing a young queen from a nucleus, and introducing her by the direct method to a queenless colony. She remained on the comb for a little while, and then the bees prepared to ball her. I recaged her, and let her crawl again to the combs of the former nucleus; but before I could rescue her she was stung to death. Let Mr. Miller try this experiment some day: Take a queen from her hive and cage her in another colony for an hour. After that, let her loose on her own combs, as he would had she been caged in the former hive for that space of time. I advise him, however, not to use a valuable queen for the experiment. Indeed, the advice has been well given, not even to let the operator's fingers touch a queen's body when clipping her.

But the plan of caging that Mr. Miller tries to combat in his article is in itself a proof of the important part scent plays in queen-introduction. The fact that queens caged for a sufficiently long time to acquire thoroughly the scent of a colony, will almost invariably be accepted, while others, not so treated, will just as frequently be killed, is certainly strong evidence along this line. I have used the direct-introduction plan as outlined by Mr. Miller (it is almost the same as the one mentioned by Mr. Langstroth in "The Honey-bee"), introducing some scores of queens by it on a certain occasion in Jamaica. But, although it worked fairly well with laying queens, yet it was not quite as good as the candy plan as then practiced, and was far inferior to our present method. In one case the queen enters, a stranger, and her acceptance depends upon her good behavior, and upon how much of the "fight" has been taken out of the bees by smoke; while in the other she has already become a member of the colony.

Mr. Miller has only to test the caging method to find out that it is the safest by which queens can be given to fertile-worker colonies. Cage a queen in such a colony for a few days; she acquires the scent and is accepted before she is released. Last season we kept a few of these colonies for Dr. Phillips to experiment with. They were so alive with laying workers that he gathered quite a number taken in the act of laying. As soon as he was through with his experiments we caged and introduced virgins, which were duly accepted and fertilized. Mr. Miller ought to try a plan before he condemns it.

Dr. Phillips is a zoologist, and, from a

scientific standpoint, one of the best authorities of bees in this country. Last summer, while introducing a lot of newly hatched virgins to baby nuclei, I was about to take one in my fingers, when he called to me:

"No, George, don't handle them. Let them run in direct from the nurseries."

He was right, for even the miniature nuclei seemed to resent the foreign odor thus transmitted.

With the abundant practical evidences that exist, and with the support of men of Dr. Phillips' caliber, I think the orthodox belief is still tenable.

I may remark, in conclusion, that men who make a business of raising queens must have something tangible to work with. Certain peculiar incidents may occur at times which seem to upset established rules, and induce us to believe that conclusions which have been drawn after much patient labor and careful thought are without foundation. But let us learn to distinguish between the exceptions and the rule. The present methods of queen-introduction, whether practiced as the editor mentioned in the article referred to or not, are based largely upon the sense of smell, and they give satisfaction. Even the plan which Mr. Miller advocates and projects in proof of his theory owes its success, perhaps more largely than he recognizes, to the fact that the odor of queen and bees is affected by the smoke (usually tobacco smoke) which forms so important a part in this particular method of introduction. If, however, ninety-nine per cent of us are following an erroneous theory, we are open to conviction; but the burden of proof lies with Mr. Miller.

GEO. W. PHILLIPS.

Denison Univ., Granville, O.

THE WINGS OF THE BEE.

III.—The Development of the Wing.

BY E. F. PHILLIPS, PH.D.

The two first articles of this series dealt with the adult wings of the bee and the abnormalities which have been observed in the venation. We will now take up briefly the development of the wings during the growth of the insect from the egg. Possibly a more natural method of arrangement would be to study the development first; but this is less desirable because of the fact that a knowledge of the final result is necessary to appreciate fully the things found in the earlier stages.

The first indication of wings to be found in the developing bee is the presence of folds in the body-covering on the upper side of the meso and meta thoracic segments of a young larva. On account of its habits of life the larva needs neither wings nor legs; but both of these begin to develop during this stage and in a very similar manner. A vesicle, or pouch, of the body-covering is formed, which is to be a wing; but since the

presence of four such protuberances would hinder the larva they are pushed into the body like the finger of a glove turned in until the tip of the finger is just below the surface of the glove. At the same time that these infolded pouches are formed from the body-wall, the rudiments of the future tracheæ of the wing can be seen. These infolded wings increase in size during the larval stage; but since they do not extend beyond the body-wall they become folded.

During the pupa stage when the young developing bee ceases to take food, and is sealed up by the workers, the wings gradually unfold outside of their pouches, due to increased blood-pressure, and go through various changes until they reach the adult condition. From the method of formation it will be seen that each wing consists of two membranes. This outfolded pouch is, in the early stage, filled with the blood, and tracheæ grow out into it. Thickenings appear on the membranes, which ultimately become the veins or nervures of the adult wing. At a later stage the layers corresponding to the future upper and lower surfaces of the wings become closely applied, and fuse, except along those lines where tracheæ are present; here also the blood circulates, and these lines form part of the future veins.

In many insect wings each vein marks the location of a branch of the tracheæ in the developing wing, but this is not true for hymenoptera. In the pupal wing of the bee there are three tracheal branches coming from the thorax along the radius, cubital, and anal veins (see Art. I. for the location of these veins). The first and third of these follow the veins regularly; but the one beginning in the cubital vein passes along the medio-cubital cross-vein and there divides, the anterior branch following the vein radius-one, and the posterior being found on the outer portion of the medial vein. This is of importance since it indicates that, in the hymenoptera, changes have taken place in the development which make it hard to homologize the veins of the insects of this group with other insect orders.

The entire surface of the wings is covered by very short hairs with an expanded base, while near the bases the hairs are comparatively long. The cuticle of the wing in the pupa stage was, of course, composed of living cells; but as the insect reaches its adult condition these dry up and nothing remains but the cell membranes. Careful microscopic examination will reveal some of the boundaries of these cells although they have ceased to be living units.

In the development of the wing the size of the cell in which the pupa is placed is a very important factor in determining the shape of the adult wing. If the cell is small the wing can not become wide; and to give the proper amount of wing surface it becomes relatively longer. If, on the other hand, the cell is large, *e. g.* a drone-cell, the wing becomes wider and relatively shorter. This was shown to be true by a long series of measurements of the veins *M* and *m*. The

vein *m* is about twice as long as *M*, but the ratio varies all the way from 1:1.7 to 1:2.6. For bees in large cells and with wide wings the ratio was less than for bees from small cells and with long wings, and the relative widths and lengths are in inverse proportion to each other within certain limits.

Philadelphia, Pa.

THE IMPORTANCE OF HAVING QUEENS REARED FROM THE BEST OF STOCK.

Improving the Quality of your Bees; that Two-hundred-dollar Root Queen.

BY E. W. ALEXANDER.

How many times during the last few years the different writers for our bee journals have told us the necessity of keeping young prolific queens in all our hives if we expect to get good returns! But how seldom have they told us of the importance of having those queens reared from the best honey-gathering strains of Italians that could possibly be found! This I consider one of the most essential things connected with successful bee-keeping; and as I have had some letters of inquiry since the Nov. 1st issue of GLEANINGS, in regard to the kind of bees I keep, the particular strain of Italians, and what I consider the principal requirements in order to secure a large surplus of honey, and several other questions of less importance, I will try to answer some of them through the medium of GLEANINGS.

First I will say that, of all the thousands of Italian queens that I have bought and reared since their first importation to this country, I have *never* sold a queen in my life, and I never expect to. We buy and rear only what queens we want for our own use; so hereafter, when I speak of the strain of bees we keep, or the strains of others, don't for one minute think that I am in any way interested in selling queens.

We now have what might be called a combination strain of bees, as they have been bred for nearly twenty years from the best honey-gathering strains of Italian bees that money could buy; and during this time I have thrown out every queen whose bees were poor honey-gatherers; cross or vicious in handling, addicted to excessive swarming, or were restless in winter quarters, wasting themselves away and coming out weak in the spring. All such colonies have been marked, and their queens superseded the following summer. In this way we have acquired as fine a strain of bees as there is in the United States.

Prof. Frank Benton, of Washington, D. C., spent a day with us last summer; and after carefully looking over our apiary he said that, in all his travels through the United States, including Southern California, he had never seen so large an apiary nor one which had a finer strain of Italian bees. I speak of this simply to let the readers of GLEANINGS know what can be accomplished

by thorough, judicious breeding. To this special care and attention in producing this strain of bees, along with careful management, I attribute our success in getting large yields of surplus honey.

You all know that, a few years ago, The A. I. Root Co. told us that they had found in one of their apiaries a queen whose bees gathered far more honey than any other colony, and that they saw such a decided difference in favor of this queen and her bees that they valued her at \$200 for breeding purposes. Now, as I was fortunate enough to get 100 granddaughters of this \$200 queen from L. H. Robey, and have had those 100 queens in our apiary for the last three seasons, I am sure I know something of their real value. First, we have had very few natural swarms from those queens—I don't think over 20 from the 100 colonies during the three summers; and when extracting we have always had very heavy combs from those bees, usually of nice light honey, even when our buckwheat was in full bloom. I am sure, therefore, that the blood we now have in our apiary, from that \$200 red-clover queen, has given us several tons of additional surplus honey. I have also had some fine honey-gathering strains from other parties.

I wish now to speak of some queens I bought 16 years ago. I got twelve \$1.00 queens from one of the principal queen-breeders at that time, which I introduced into good colonies about June 1. Although it was a good season I not only got no surplus from any of them, but had to give five of the twelve hives some heavy combs of honey from other colonies in order to carry them through the following winter. Twice since then I have bought Italian queens that were but very little better. Now, suppose our apiary had been stocked with such queens as those last spring. If so, instead of our having over 35 tons of honey for sale this fall, we should have had to buy several tons of sugar for feed.

How natural it would have been, if we had those miserable bees, to lay all the blame on the poor season or on the poor location; or, if some one had brought a few colonies of bees within five or six miles of the apiary, how some would have growled about the infringement on their territory, and the overstocked locality! Yes, my friends, too many of you have allowed your bees to degenerate into a miserable lot of hybrid mongrels that are not worth the room they occupy in the bee-yard.

Young Italian queens reared from the very best honey-gathering strains are now so cheap that I am very sure none of you can afford to take your chances on going through another season with poor stock. I will admit it takes some money and some work to requen an apiary; but if rightly done it will pay you well, even the first summer. Then see what a fine yard you will have afterward.

In answering some of those other questions I will say, first, the season is of more

importance than any other one thing; then the strain of bees; the management; and, after these, the location and some other less important matters.

My friends, there is no luck and chance in bee-keeping. If your bees don't give you any surplus, pry into every thing connected with them until you know the reason why. I can not understand how some men can be so indifferent to the most vital parts of their business.

Above all things, don't be discouraged when the losses come, as come they will; let them find you more determined than ever to push on until success and all its pleasures crown your years of labor.

Delanson, N. Y.

[That Root queen which we valued at \$200 died some two years ago. We have none of her daughters that are her equal, although some are very good. We would give \$500 if we could put her back in the apiary when she was six months old—yes, we would make it \$1000. We have many other testimonials showing the intrinsic merit of this stock. When we claimed this queen was something remarkable, many of our friends did not believe it. Some of them even scored us for putting the price of \$200 on her. Others said that no queen could be worth \$200.]

I want to say in this connection that one reason why this \$200 queen was so valuable was because her own bees as well as the bees of her daughters showed long tongues. But length of tongue was not the only valuable quality possessed by her stock, as many hundreds who tested it can certify.

Now, lest this may sound like an advertisement I would say that the old queen is dead, and none of her daughters show up as well. It is doubtful whether we could furnish stock as good as that sent to Mr. Alexander. The particular point I wish to bring out is this: That a few queens are extraordinary, and it pays to use for honey-production only the very best. Nearly every bee-keeper has some one queen that is clear ahead of all the rest. Breed from her exclusively.—ED.]

THE UTAH HONEY AND WAX EXHIBIT

In the Agricultural Building at the St. Louis Fair.

BY L. D. STILSON.

The Utah exhibit of honey and beeswax at the World's Fair was very unique in design, and it certainly was an artist who could put up such a one. The central figure of wax represented the Goddess of Liberty sitting on her throne, a bee-hive. At her feet lay the implements of agriculture—the hoe, rake, scythe, pick, shovel, all made of beeswax. Over her shoulders was thrown the American flag, while behind was a ton or so of the finest alfalfa honey, extracted. This exhibit was in charge of Miss Hender-shot, a former Nebraska girl, who could tell you more about the resources of Utah than

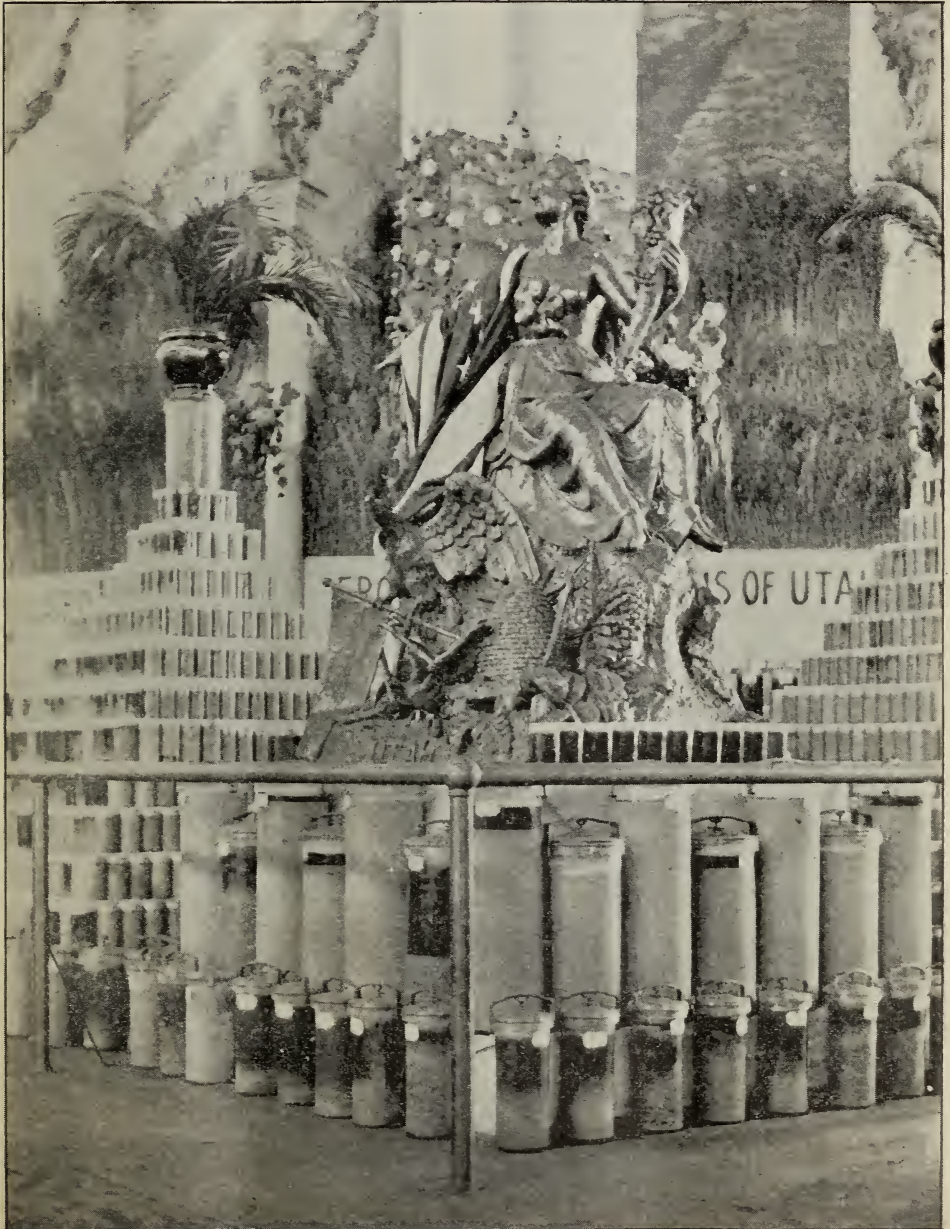
half the men who had lived there all their lives.

York, Neb.

[Those who visited the Agricultural Building at the recent fair in St. Louis will remember some beautiful sculpture work in butter, showing cows, and milkmaids in the act of milking. Some of those pieces cost

something like \$3000. There was one wax exhibit that was, perhaps, the most expensive and most unique that has ever been exhibited at any exposition of any kind. I refer to Utah's honey and wax exhibit under the direct charge of Miss Hendershot.

Immediately after the St. Louis convention Mr. L. D. Stilson piloted a party of



UTAH'S HONEY AND WAX EXHIBIT IN THE AGRICULTURAL BUILDING AT THE WORLD'S FAIR, ST. LOUIS.

bee-keepers through that immense building, and in the course of our wandering brought us to this exhibit. I requested Mr. Stilson to secure for me a photo, which he did, and his letter above is in explanation. If I remember correctly the goddess in wax was life size, and the whole substructure showing the hives, flags, etc., was also wax. The honey in the big jars in the foreground, as will be noticed by the color, is candied, for alfalfa will assume that color in a comparatively short time. Some of the jars are partially candied, and some wholly so. Taking it all in all, the exhibit was a remarkable one. The wax sculpture work could not have cost much less than three or four thousand dollars, if the figure paid for the same class of work in the dairy department would be any criterion. —ED.]

THE DITTMERS AND THEIR FOUNDATION BUSINESS.

Editor York's Visit at Their Place.

It was my pleasure to meet Mr. and Mrs. Dittmer at the Chicago-Northwestern convention a few weeks ago. I had previously read the sketch of them and their business, in the *American Bee Journal*, and was prepared to meet some very nice people, and I did. I had a most enjoyable chat with both Mr. and Mrs. Dittmer at the breakfast-table—one that I shall long remember—and later on at Minneapolis I had the pleasure of meeting the two younger members of the family, who are chips of the old blocks. I am glad to place before our readers the sketch that appeared in the *American Bee*

Journal, even if the Dittmers are competitors. —E. R. ROOT.

We left St. Paul at 8:30 Wednesday morning, Oct. 19, on the Chicago & Northwestern Railroad, and arrived at Augusta, Wis., at about 12:20 P. M. It was just beginning to rain—a sort of drizzle-drozzle. We inquired of the station-agent where Mr. Dittmer's factory was, "Gus Dittmer?" he asked. "Why, right across there," he pointed; where you see those red buildings."

We thanked him, and started for the "red buildings." By the way, Mr. Dittmer has done his share toward "painting the town red," for he has four buildings of that color devoted to the bee-supply and comb-foundation business.

It was a little late, so we stopped at the hotel for dinner, after which we went on to Mr. Dittmer's. Arriving, we opened his office door, and there he was as busy as a honey-bee in a basswood-blossom. Of course he was surprised to see us, as he was not expecting us at all. We had met him at the Wisconsin convention last February, so we were not entire strangers to each other. He is the excellent secretary of the State Bee-keepers' Association.

After a little visiting he took us over to his pleasant home to meet his good wife, daughters, and son. The second son, Clarence, had left about a month before to attend school in a Kansas university, having graduated from the Augusta schools last June. "Fred" (24 years) and "Bessie" (22) are the oldest son and daughter, respectively, and are the main helpers in the business.

Fred is really his father's right-hand man, having entire charge of the manufacturing and shipping, while Mr. Dittmer attends to all the office work, melting wax, and has a general supervision of the business.

Bessie runs a comb-foundation machine as easily as many another young lady would run a sewing-machine. The fact is, that the whole Dittmer family are "in the business," and they are a happy family. They seem to enjoy each other so much. We shall not soon forget our stay there.

We had never before seen comb foundation manufactured, so here was our chance. Every thing was open to us except the sheeting process, which is one of the Dittmer secrets. We should judge, however, from what Mr. D. said, that this process of sheeting beeswax is superior to that of the Weed process.

It was very interesting to see the machine turn out the clear, bright surplus foundation and pile it up with sheets of tissue paper between the sheets of foundation, all done automatically. Mr. D. probably has the only automatic papering arrangement there in existence.

It is a very simple arrangement indeed; and the proper length of both paper and foundation is cut off together with one movement of the sharp knife.

Mr. Dittmer himself studied out all of his comb-foundation methods, except, of course, the roller mills through which the long plain sheets of beeswax pass and receive the impressions of the comb-cells. It took him several years to perfect his beeswax melting, purifying, and sheeting processes. It all involves much labor and care, but when his beeswax is ready for the foundation-mill it is almost as transparent and free from impurities as glass, comparatively speaking.

Mr. Dittmer's output of comb foundation this year (1904) will be about 25,000 pounds. His daily capacity is about 1500 pounds. We were surprised to learn this. The fact is, his product has been received with such general favor among bee-keepers that the demand has steadily increased until he is now, we believe, third in the list of comb-foundation makers in this country. Next year, if the season proves good, we shouldn't be surprised to see him occupy second place. He is so energetic and enthusiastic, and there is such a "get there" way about him and his whole family, that he is bound to succeed. Well, he deserves all the success that may come to him. All men like to see an honest, industrious man win. Gus Dittmer is a winner. You can put that down somewhere. He is grateful for the patronage that has come to him, and is ready to welcome more.

It is truly wonderful to see what Mr. Dittmer has accomplished since the disastrous factory fire which almost



GUS DITTMER.

wiped him out last February. An ordinary mortal would have given up the battle. But not so with Mr. Dittmer. He and his faithful family gathered themselves together as quickly as possible. Loyal friends and neighbors volunteered all kinds of assistance. Some offered him all the cash he might need. Mr. Dittmer said it was almost worth the fire loss to see how true were proven some of their friendships. It strengthened their faith in humanity. But, after all, the fire was a hard blow in another way, as it put off several years the long-hoped-for new dwelling-house. Still, that will be on hand shortly, and will be appreciated all the more when it does come.

Augusta is a town of 1500 inhabitants, in a rich agricultural district. Mr. Dittmer has resided there practically all his life, although he was born in Prussia, Germany. He is a prominent citizen in his town and county, and active in all good causes. His habits have been such as would invariably produce the best in character as well as in substantial results, as the world measures success. These characteristics are shared in by Mrs.

now made can be and is nailed in three different ways, and is even shown in two different ways in your catalog.

H. H. Hyde and C. Davenport are also emphatically right about there being no necessity for a $\frac{7}{8}$ -thick top-bar. Your idea "that a frame with a $\frac{7}{8}$ -thick top-bar is very much stiffer than one with only a $\frac{1}{2}$ -inch bar," may be true if inefficient one-inch nails are used; but if you will take a hint from W. L. Coggshall, and make end-bars at least $\frac{3}{8}$ -inch thick, then nail down with 5 or 6 penny box nails you will still have an exceedingly stiff frame, though the top-bar be only $\frac{1}{2}$ or $\frac{5}{8}$ inch—in fact, a stiffer frame than the regular Hoffman with small nails.



GUS DITTMER'S FOUNDATION-FACTORY, AUGUSTA, WIS.

Dittmer, and thus they are bequeathing to their children a legacy richer and more enduring than that of financial wealth or earthly position. Character and education—the best of life's equipments—can not be purchased, or even transferred by order. They are the result of a steady growth and development throughout the years, hence their higher and more lasting value.

HOFFMAN FRAMES WITHOUT THE V EDGES.

Use Thinner Top-bar, and Thicker End-bars and Bottom-bars, with Heavier Nails; Hoffman Not a Bad Frame.

BY E. F. ATWATER.

Those two articles on Hoffman frames in the Nov. 15th issue are just about right, according to my experience. I have handled for two years 75 colonies on Hoffman frames, with both edges of end-bar square, and have found no difficulty, and, as C. Davenport so well says, the regular Hoffman frame as

I know this after the use of about 2000 such frames the past season.

Top-bar full length? Yes, sir. That little assertion in your catalog, regarding such top-bars and the men who prefer them, "most likely they do not handle frames enough to make it an object to have them easily movable," is away off. You must use a pry with any frame, and it takes no longer to pry loose a long top-bar than a short one.

Davenport's suggestion of pointing the top-bar at ends may be good; and, as he says, the top-bar must be full width to the end, and not be made narrower to allow a better finger-hold, and thereby be very seriously weakened at a vital point. H. H. Hyde is on the right track in demanding a thicker bottom-bar. I have several thousand frames in use with bottom-bars $\frac{1}{8}$ thick, and they are much more satisfactory than the usual thickness of $\frac{1}{4}$ inch.

Among some bees which I bought a year

ago there is quite a variety of Hoffman frames. There are some made by E. Kretchmer, years ago, in which the top-bar is full width to the end; others of Root's, Lewis', and other makes which I can not identify. There are a few very nicely made Hoffman frames with end-bars $\frac{3}{8}$ inch thick, and both edges square. If these latter Hoffman frames had a top-bar full width to the end they would be ideal for my use.

After trying 2000 shallow unspaced frames, hanging on nails, many thousand of various other unspaced types, including the Coggs-shall pattern (best of all unspaced frames), I am not yet prepared to say that the Hoffman is not a good frame.

Meridian, Idaho, Dec. 26.



FEEDING BEES IN SPRING.

A knock at the door. Mrs. D. opens. Then I hear, "Is Mr. Doolittle in?"

"Yes, come in," Mrs. D. replies, and a tall good-looking man is ushered into my sanctum.

"My name is Mitchell, and I came to have a little chat with you about feeding bees in the spring."

"Do you think it will be necessary for you to feed much, Mr. Mitchell?"

"I fear so, as my bees went into winter quarters last fall light in stores."

"I think it would have been the part of wisdom to feed them last September."

"Undoubtedly it would; but business and sickness prevented, so it is too late to discuss that part now. How would it do to feed outdoors, allowing the bees to go a few rods for the feed?"

"Outside feeding has been recommended in the past by some good apiarists; and where there are no bees, either in the woods near by or at some of the neighboring farms or houses within two miles of the one who desires to feed, the plan will do. But as a rule the person undertaking feeding in such a way finds out sooner or later that he is feeding many other bees as well as his own, and it is not a really pleasant fact to know that you are feeding other bees, going to dollars of expense often in this way, from which you can not expect to reap any pecuniary benefit."

"But, would not this be the best way if you were sure of feeding no other bees than your own?"

"There are other items which enter in here that it is well to look after. Such feeding is very liable to engender robbing, especially if the feed given contains honey

to any amount; and if given in the scanty supply that is often recommended in stimulative feeding, when the feed gives out, along in the hottest part of the day, the scent of the just-stored feed from the hives places a great temptation before such bees as have just before been carrying feed to their fullest capacity, on now finding themselves suddenly deprived of any more work to do; so they set about trying, in an almost maddened way, to get the savory sweet from the hives from which the savor comes; and woe betide the weaker colonies that do not have sufficient numbers to repel the attack of a numerous throng of excited marauders which have been appetite-whetted only just before, with nothing now, in a legitimate sense, to supply that appetite. Bees placed in such a condition are made fools and robbers beyond almost any thing else you can think of."

"I had not thought of this robbing part. I had a big time of robbing last spring; and if outside feeding would have a tendency to make matters worse, it certainly is something worth considering."

"You are certainly right, there. But about the worst feature of outside feeding we have not touched on yet."

"Possible! What is that?"

"By such outside feeding, bees can not be fed in *proportion to their needs*, one colony as compared with another."

"How is that?"

"Some of the colonies in the yard may have all the honey in their hives that is for their best good, while other colonies may be nearly or entirely destitute, and in a wholesale outside feeding there is nothing to hinder those colonies having more honey than they need from securing as much or more of the feed than those on the verge of starvation; and thus it comes about that, while the needy ones are helped, those having an abundance are hindered."

"How can they be hindered by feed at this (spring) time of the year?"

"Easily. By the amount coming into the hive taking up the already scanty supply of cells left vacant for the queen to deposit her eggs in. Thus we have a crowding-out of the queen just at the time she should have all the room needed in which to deposit eggs which are to develop into workers for the honey harvest only a little way ahead."

"You are raising objections I had not thought possible. Have you any more?"

"Yes, and this last one often proves nearly as formidable as the others. Should the day in which you commence to feed prove to be one of those fitful ones which we very often have in the spring, after an entirely clear and pleasant morning, a day when the wind rises up, and floating clouds pass over the sun, causing a few minutes of bright sunshine and a much longer number of chilly minutes, many bees will be lost by trying to carry the feed at a time when they will become chilled in loading up and in trying to fly home, and the loss of a single bee

at this season of the year is of more account than the loss of several hundred after the harvest of white honey is over. This same loss is liable to occur on all such fitful days, but not to such a great extent as on the first one, when the bees are liable to go wild with the excitement the new-found stores produce. I know there is something very fascinating about this outside feeding, especially seeing the bees go to and fro in their eager scramble after the coveted sweets; but after years of experimenting along this line I have come to the conclusion that such feeding, as a rule, is a delusion and a snare."

"Well, how *would* you feed?"

"By using a division-board feeder, placing one in each hive where the colony needed feeding. As soon after the bees have their first flight in spring as it is possible to do so, each colony should be examined regarding their supply of stores, and all that do not have sufficient to carry them through to the time you may reasonably expect the bees can get nectar from the fields, should have a feeder given them; and on every evening, when not too cold, they should be fed."

"How much do you consider sufficient to carry a colony from their first flight in the spring to the time of the blooming of flowers which yield nectar?"

"I place the amount from twelve to fifteen pounds. Then, if the weather is favorable during all of the early bloom, especially the fruit-trees, they need no further looking after as to their stores; but should the weather be such that the bees can secure little or nothing during fruit-bloom, it may be necessary to feed even those which had fifteen pounds at the opening of spring, for honey is consumed very rapidly when brood-rearing becomes well advanced."

"Then, such as had fifteen pounds and over of stores in early spring, you would not feed at all, should the season prove a good one?"

"That is the way I feel in the matter. While many believe that it pays to feed nightly for stimulative purposes, more than thirty years of experience along the line of feeding compels me to say that, with myself, there is not enough gain made by such feeding, over and above what brood the bees would naturally rear where they have *plenty* of stores, to pay for the extra work of feeding."

"How much would you feed each night where any colony was deficient in stores?"

"If they were entirely destitute, then I should want to feed enough the first two or three nights to insure against starvation, should a cold spell come on during which it would be impracticable to feed. After this, and with all colonies which had from three to ten pounds of stores, I would feed about a teacupful of thin warm sweet, it being about the consistency of what the bees generally secure from the fields, feeding every night when warm enough, till the flowers begin to yield nectar."

"I must be going now."

"All right; but before you go I wish to say that you can tell yourself about its paying *you* to feed if you will keep watch of these fed colonies, and those having plenty of stores so that they need no feeding. Your experience may be different from my own. But don't forget to take one of the combs of sealed honey every week or ten days from your colony having plenty of stores, and put it in the center of the brood-nest, after having broken the cappings to the same by passing a knife flatwise over it, on the plan of spreading the brood given during the past by myself and others. This last is the best plan of stimulating brood-rearing which I know of. The removing of this honey causes the bees to feed the queen, and she in turn deposits more eggs than she otherwise would, while the excitement caused by the removal of the honey creates a warmth in the hive which overcomes any drawing-away from the brood which might occur on any cold spell coming just after the brood had been spread by inserting an empty comb in the center of the brood-nest, as is generally done in using this plan of stimulating, looking toward an increase of bees in time to take advantage of any special honey harvest that may occur in our locality."

[See editorial, elsewhere. — Ed.]



TURNING ON THE LIGHT TO STOP THIEVING; ARRANGEMENT OF HIVES IN A HOUSE- APIARY.

I have been here two years. I began with 4 colonies, and now have 17. Thieves have broken in on me twice. I followed your suggestion of putting up a notice of \$100 reward for their arrest and conviction, but they paid no attention; and the second visit was made, and, of course, now I must resort to something else. I thought I would try a bright lantern in my little apiary. Its bright shining might cause some apprehension on their part of hearing something drop. They haven't visited me since the lantern was put up.

I am putting up a bee-house 45×7×6½ ft. high. Now, can't you tell me how far apart I ought to put my hives in this house, hives on both sides? Will it be advisable to put two rows on each side, the second row to be two feet above and just between those below, thus—
horizontal, ☐ ☐ ☐ on the
five feet ☐ ☐ ☐ about
or nearly so? ☐ ☐ ☐ apart,

Huntington, West Va.

G. HOUCHINS.

[Your scheme of turning on the light to

stop thieving is excellent. Still, the plan of offering a reward will, in many cases and localities, serve to give notice to the parties who are trespassing that you mean business and will prosecute to the fullest extent of the law. There is another plan that would work better in your case, and give you immediate notice of the night marauders, and at the same time give you a chance to bring into play a shotgun loaded with very fine shot—not coarse enough to kill but large enough to serve as a means of identification. Even if the parties were not identified, one *warm reception* like this would probably prevent them from taking the same chance again. The plan, briefly stated, is as follows: Run a black linen thread through screw-eyes attached to stakes in the ground, clear around the bee-yard. One end of this thread must be made fast, while the other should be secured to a wooden plug separating two brass springs. These should be nicely adjusted so that the plug, when jerked out by the black thread, will allow the two ends of the brass spring to come together and complete the circuit of an electric bell, the bell being stationed at the head of your bed. This plan has been tried in stopping trespassers in chicken-yards and other places, and works successfully. The black thread should be so stationed that it will be about two feet above the ground, and the screw-eyes should be so placed as not to cause any friction on the thread. The legs of the trespasser runs into it, because he can't see such a fine black thread at night, thus causing the plug to be pulled out, allowing the two ends of the battery wires to come in contact. Even if only a blank load be fired at him he will be so scared as not to try it again.

Any electrician can furnish the necessary outfit at a very small cost.

By a "bee-house" I suppose you mean a house-apiary in which the hives are located, with free access to the outer air through a tube reaching through the house-wall to the entrance proper of the hive. It does not make much difference how the hives are arranged. In any case, use outdoor hives and place them together as closely as possible, and yet permit of handling. There should be two rows, one about two feet above the lower one and on each side of the house. The outer entrance or doorstep, we will say, of each colony, on the outside, should be painted different colors. To help the bees further to distinguish their entrances, make each alighting-board or entrance different from the one next to it.—ED.]

SHAKING OR BRUSHING TO KEEP DOWN SWARMING; TWO IMPORTANT REQUISITES.

I have six colonies of bees, five of which are last season's swarms. The coming season I wish to make honey rather than increase; that is, I do not care for more than three or four swarms (or new colonies). I am unable to be at my bee-yard all through

the day to watch for swarms, so I should like to know if there is not some way I could discourage swarming, and, instead, make such increase as I wish by "shook" swarms, or some similar method of artificial swarming. Please state the proper way to do this. In this section the honey-season is usually of short duration; and, while the one *old colony* I had last year gave me two good swarms (one the day after the other), it did not make one pound of surplus honey. We had a moderate honey-flow last season, and white clover stayed in bloom longer than usual, though it did not seem to produce as much honey as it generally does, our main dependence appearing to have been the poplar, locust, and fruit-blossom.

Nashville, Tenn., Jan. 10. TENNESSEE.

[The shaken or "shook" swarm method, as some prefer to call it, will, I think, solve your difficulty if you follow carefully the directions. There are two very important requisites to make the plan a success. First, wait till the bees begin to show signs of swarming before shaking or brushing; second, just before shaking, smoke the bees thoroughly and get them to fill themselves with honey, and otherwise give them a good jouncing or bumping; and then when the bees are run into a hive they are full of honey just as they are when they swarm out naturally. Without this filling-up the bees are liable to swarm out for want of food, even if the act be performed when the bees are preparing to swarm.—ED.]

CLEANSING FLIGHT WHEN SNOW IS ON THE GROUND.

1. When bees are wintered in the cellar, will it do to take them out for a cleansing flight while there is snow on the ground? Some tell me that the bees will alight on the snow and become chilled, even if the atmosphere is quite warm. In Doolittle's Conversations he says it is all right; but while that might do in New York I should like to know if it will hold good for Minnesota.

2. I have been thinking some of sowing buckwheat among the corn when we cultivate the last time. Do you think the bees would get enough out of it to make it pay?

Albert Lea, Minn.

C. M. JENSON.

[1. It would be all right to let your bees have a cleansing flight, even if snow is on the ground, providing the temperature is up to 60, and it is thawing rapidly. If you are reasonably sure of having a warmer day, wait till it comes up to a higher temperature.

2. You will have to sow a great deal of buckwheat to make any showing in the hives. The plant does not yield very much honey, so far as I know, except in New York. If the crop will pay you aside from the honey, you would be warranted in sowing it in the manner suggested. It takes an immense acreage of buckwheat to produce any surplus. We have had from 10 to 25 acres within two miles of our home yard; and while the bees worked busily on the plant in

the morning and again toward night, the amount actually stored was almost imperceptible. The probabilities are that the conditions in our locality are not favorable for much secretion of nectar from the plant. —Ed.]

DOOLITTLE'S HIVE; IS THERE ANY ADVANTAGE IN CUBICAL SHAPE? PUNIC BEES.

Would you please give a description of the bee-hive, with dimensions, used by Mr. Doolittle? also the favorable and unfavorable points of it from your point of view? Would you also give your views of a divisible hive with the brood-nest about a cube in form, aside from the inconvenience of non-standard size for supplies?

Have the Punic bees any advantage over the Italians? F. B. HILL.

Sioux Falls, S. D., Jan. 4.

[Mr. Doolittle, up till within a few years back, used almost exclusively the Gallup hive, the frame of which was $11\frac{1}{2}$ square outside measure. This would make the inside of the hive approximately 12 inches in the clear. But in more recent years Mr. Doolittle bought an out-apiary consisting of Langstroth hives; and if I am correct it is now his opinion that beginners had better adopt that hive because of its being standard. There is no special advantage in a cubical shape over the Langstroth, except perhaps in a few localities for wintering. Similarly I would not advise a divisible brood-nest in the shape of a cube, and a cube is not adapted for comb-honey production because of the small amount of section room. The Langstroth hive, for example, allows of a large amount of super space on top of the brood-nest; and in these days, when comb honey is produced so much, this is quite an advantage.

We tested the so-called Punic bees a few years ago. We did not discover that they had any quality that was in any way superior to any of the bees in this country. They were fearful propolizers, bad about stinging, and in my opinion they were not even as good bees for general use as the common blacks of this country. They were very much inferior to Italians; and from reports I have read of them since, I should not think any one would be wise in introducing them into his yard. A few Punic drones might make a bad mix-up in the stock that could not easily be eradicated. —Ed.]

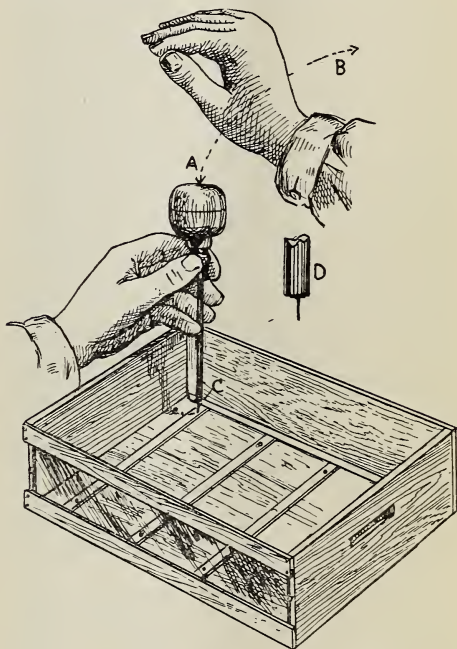
THE "LIGHTNING" NAILER; HOW TO SECURE NO-D RIP CLEATS.

In the winter of 1904 I was nailing no-drip strips into 15-lb. shipping-cases. The cases were so short that I had difficulty in getting my tack-hammer into them in a position where it could be used to any advantage; and after getting several painful raps on my numb fingers (for my shop wasn't very warm) I decided that there must be some better way of doing the work.

After casting about in my mind for a time for a suitable instrument I made the tool

shown in the cut. It is about 8 inches long over all, and consists of two parts, a wooden handle and a magnetized steel shank with a smooth flattened end to which the head of the tack adheres. I have used this tool the past season, and it has proved itself to be the very thing wanted, doing its work silently and pounding no fingers.

Besides being very useful for nailing down no-drip sticks it is the best thing that I have found yet for putting foundation in frames, for with it the tightening-strip can be forced down, and small nails thrust into it without tearing and breaking the foundation as one frequently does with a hammer.



SMITH'S LIGHTNING NAILER.

In use, the tool is grasped in the right hand by the handle (something like a screw-driver), and the end of the shank is brought in contact with one of the tacks, which should previously be scattered about on the top of the bench; then with the left hand hold the point of the instrument steady to prevent the tack from toppling over, and thrust down with the right, which firmly seats the tack in the wood.

The tacks should be scattered enough so that not more than one will be attracted to the magnet at a time, and the tool held firm and true, with both hands, when pressing in a tack, to prevent it from toppling over.

I claim for it the following advantages:

1. It is noiseless. One can work in the kitchen, or anywhere for that matter, with no annoyance to other people.
2. It will do the work quicker, picking up the tack, which is always a difficult job with the small nails used for this purpose, and

thrusting it home with practically one motion, while with a hammer the tack has to be picked up, started, and then pounded in.

3. It can not pound your fingers, they being out of the way.

4. It will last indefinitely, there being no hammering done with it to destroy its magnetism.

Like all other tools, one has to learn to use it. Who would think of keeping bees and getting along without a hammer? Still, every one can remember the jammed fingers he got when a boy learning to use this same tool.

ROBERT H. SMITH.

Brasher Iron Works, N. Y.

[The illustrations show a method of using the tool differently from that described by Mr. Smith. Mr. S. sent it on to me to test, and on the first few trials it did not prove to be satisfactory, because I picked up a tack, then jammed the tool, tack and all, with one blow into the wood. The result was, the tack would topple over instead of entering the wood. After some correspondence with Mr. Smith I tried the tool again, but this time I held the tool in my left hand, after picking up the tack, then placed the point of the tack with the tool where it would enter the wood. One blow of the right hand, while holding the tack and tool in place with the left, would drive the tack home. I gathered the impression this was the way the tool was used, and instructed our artist to make the drawing accordingly. It works either way, and the reader can take his choice.

It is, perhaps, proper to state that in almost any hardware store small magnetic tack-hammers can be purchased which will do the work of this tool very satisfactorily. If the handle is too long, it can be cut off so it can be used in places that are somewhat cramped.

It is the general practice nowadays not to use nails to secure the no-drip cleats. Some use glue or mucilage, and others use only thick honey; and, by the way, honey makes a very good paste. A little honey daubed on the back of the cleat will hold it securely against the paper tray. Place it right, and it will stay where it is put.

The tool of Mr. Smith is a very simple one, however, and may be found to be very useful in some kinds of light nailing—more handy, perhaps, than the magnetic tack-hammer. In all of our light work where we do not use nailing-machines, we use these small magnetic hammers; and any beekeeper or mechanic who has not familiarized himself with their use, has certainly got something to learn in the way of saving time.

I can see one distinctive advantage in favor of the Smith tool, and that is for nailing numbering-tags or wire cloth on a hive containing a populous colony. It may be handy, also, in securing wire cloth on queen-cages. It is not advisable to give the queen-cage a heavy blow, especially if the queen has been taken in the height of her egg-laying from a strong colony.—ED.]

PICKLED BROOD; HOW HALTER GAVE THE TREATMENT.

In reference to note on page 1144 I would say that, when I started treatment for pickled brood, I shook the bees with the old queen into a clean hive with foundation starters, placing the same on the old stand. The frames and brood removed were placed in hives by themselves some distance away, adding in some instances a few frames with brood (space allowing), from colonies which showed the malady in a milder form. Being queenless the spreading of disease was naturally checked. Where the bees built queen-cells I let them rear their own queen; in others I placed ripe cells after expiration of about ten days, thus giving the bees ample time to make a thorough "house-cleaning" for the reception of the young queen, as they seem to be more particular in cleaning and repairing cells just before the young queen begins to lay than at any other time, led, perhaps, by instinct of reproduction.

The "shook" swarms were treated later by destroying the old queen and placing a queen-cell in due time. All queens reared were from stock in the apiary when pickled brood appeared.

Bees treated were mostly thoroughbred Italians from different strains, but none were immune to the malady. There were in the neighborhood of fifty colonies which contained pickled brood during the past season, but no indication of any disease after Aug. 20. It was not necessary to give them all treatment as described.

A. J. HALTER.

Akron, O., Dec. 24.

NONE AS SATISFACTORY AS THE HOFFMAN; WHY THE V EDGE SHOULD BE RETAINED.

I have tried several kinds of frames during the last few years, and find none as satisfactory as the Hoffman. The V-edge feature certainly should not be condemned because some nail them haphazard and they fail to fit. With both edges square I think the trouble with propolis would be greatly increased. In theory they can be kept crowded close together, and the points of contact kept clean; but propolis will work in, and the wide edges will not come together even in hot weather. Of course, to experts this looks useless; but fingers and thumbs that are a trifle clumsy can be greatly helped by applying a little honey to the working parts before trying to catch a queen by the wings.

H. E. CROWTHER.

North Kingsville, O., Jan. 10.

HOFFMAN NOT LIKED.

I have used quite a good many kinds of frames. I began with the Langstroth first, and have tried the most of them on down. I do not like the Hoffman very well. I can not handle them as well as some others. I like the Simplicity the best of any. I think they are more easily handled than any others I have tried.

F. K. THOMPSON.

Chillicothe, Mo., Jan. 6.



I will praise thee, for I am fearfully and wonderfully made: marvelous are thy works. —PSALM 139: 14.

A few evenings ago a young lady at our house stood before a little machine and sang a pretty little melody. I had seen the same thing before, and my *imagination* pictured the machine listening intently with its head tipped a little to one side. After she had finished, the machine was asked to repeat to us what it had heard; and, sure enough, the whole piece was given back to us—not only every word, but every note and inflection. The machine did not have it quite as loud, it is true, as the original human voice; but it was an exact copy. It is truly wonderful how a human being remembers what he has heard; but this little machine, costing only a few dollars, was away ahead in *accuracy* of any human being who ever lived. It gave an *exact* copy of what it had heard. You are all familiar with it; in fact, these little phonographs are in many of your homes.*

A few issues back I spoke of hearing at school in my boyhood of a machine that would fasten your picture just as you stood before a mirror. This little phonograph in a like manner fastens the human voice, catches it, and holds it with fingers of steel; and after this young lady who sang for us that evening has been dead and gone a thousand years that little cylinder will give back the tones of her voice, without a mistake. People forget; but machinery never forgets.

Philosophers and scientists have been puzzled since the world began to know how it is that one can treasure up in his memory the events of every-day life, and reproduce them fifty, sixty, or even seventy years later. How is it possible that this little brain, comparatively, of a single person, can take down and hold for future reference the transactions of every day for a lifetime? Who is there, who can meditate on the above, who has not said to himself in the language of the Psalmist, "I am fearfully

* The machine mentioned above is really the property of our five-year-old grandson, or at least he handles it and calls it his, and he takes out the cylinders, puts in others, and manages it with the air of an expert. His favorite cylinder is a bell-ringing melody. It is just ringing bells and nothing else; but the bells ring so as to reproduce beautifully that little hymn in the Gospel Hymns—

"Ring the Bells of Heaven, there is Joy To-day."

I agree with Wynne that this bell-ringing cylinder throws all the rest in the shade. The melody is not only beautiful, but the thought that the little instrument can give out a clang of bells that might be supposed to come from a church-steeple (if one did not see the instrument) is but little short of miraculous; and when you afterward examine the cylinder with a magnifying-glass, and see that those wonderful tones so sharp and startling are the result of those little dots or indentations almost microscopic in size, it makes one feel as if he were getting an inner glimpse of the handiwork of the great Father who made the human eye, the human ear, and this whole wonderful organism, with the wonderful brain, the center and ruler of it all.

and wonderfully made; marvelous are thy works"? It would be a big task to write down in a book every word we utter, say in one day. Why, bless me! it would take a big book to record just the sayings in one day of some *women* I know of; and this reminds me I believe some of the Spanish women in Cuba would utter more words in twenty minutes than anybody else I ever heard talk in the whole world. I sometimes wondered whether the listener understood it all, or whether a part of it was simply to astonish a stranger who happened to be present. Well, let us get back to our theme.

If it would take a big book to take down all your talk in just one day, how much of a book would it require for a whole year? Now try to comprehend, if you please, how many books it would take for sixty or seventy years. Now just hold your breath. None of us speak out loud *all* we think. Will somebody make an estimate of the number of books or libraries it would take to give the history of all the thoughts and actions of even a single person during his whole life? But I have not got to the end yet. There are in this world of ours about 1500 million people; and each one of these millions lives a human life more or less—has thoughts and actions and words—yes, and a memory, so that each person of ordinary ability can state pretty positively all he has *not* done in his life, even if he could not enumerate all the things he *has* done. Do you not agree that the Psalmist is right in saying that we are fearfully and wonderfully made? Scientists have at different times tried to conjecture how the great Creator, the all-wise Father, had managed to pack into a little human brain the memory of all that passes in a lifetime. I do not think any of them presume to give any kind of answer; and although it may be a little bit audacious, suppose I undertake it.

When listening to that phonograph it occurred to me that memory might be something like that machine. When you buy your machines you get for ten or fifteen cents some plain smooth rolls without any thing on them. One of these rolls will hold a song or a hymn if it is not too long; but with a magnifying-glass you can look at the surface of the roll after it is indented, and see where the steel point has made little cavities of different depths and widths, and different distances apart. When the machine "talks back" a suitable steel spring or finger drops into these cavities. You have probably seen the whole thing. So have I; but yet it looks like witchcraft every time I see it. Years ago they told us the light of day is made of seven colors, and that it could be pulled apart to prove it. They now tell us the human voice is made up of a lot of vibrations—I do not know but I should call them little explosions; and this phonograph proves it. All the tones are produced by vibrations of greater or less force, and nearer together or further apart. The indented cylinder proves it. Well, now, these brains of ours take in not only *sounds*

through the ear, but something else through the eye; something else through the touch; something else through our feelings—anger, love, hatred, etc. If memory is seated in the brain, and it rather looks that way to us poor ignorant mortals, these vibrations, sensations, or cylinders with something engraved on them are probably laid away in this little brain of ours; and in order to have them convenient of access, Nature (perhaps I had better say God, the beloved Father) has planned compartments of pigeonholes for filing away these records—well, may be something like what they have in our large offices. Our own office adjoining is now filled with great cases and ingeniously planned files for putting away records so the clerks can get at them instantly. One of these great filing-cases near the center of our large office became so heavy that it caused the floor to sag a few days ago; and the business manager said before it was relieved of some of its burden it might acquire twice as much weight. All these great expensive cases are to record the transactions of our establishment for ten or fifteen years. Inventors have been at work very busily for the past few years in making these records so an expert clerk can lay his hand on any letter in a moment. The above is just to give you a little glimpse of what the human brain has to do with this wonderful faculty of memory. Why, almost any of us can answer a thousand questions positively, one after another, even though many of them may go back a good many years. If we can not remember all we *have* done, we can remember pretty well what we have *not* done.* Now, how is it possible for this little brain of ours to be so arranged that it can contain such a perfect record of, say, a life of fifty years? Well, that is not all. Not only is the record wonderful, but the most astonishing wonder of all is that a human being can instantly “place his finger” on any thing that has happened during that period of fifty years. Then there is one funny thing about this faculty of memory. If you are getting to be toward seventy years old you have noticed that you can recall things that happened fifty years ago far more distinctly than things that happened only five years ago. I wish I could go on and tell you whether this brain of ours, so fearfully and wonderfully made, uses *cylinders* like those of a phonograph to take down impressions, and files them away in convenient cabinets. But I think I will not go into that. I will, however, touch on something else that is almost as wonderful.

Man is not the only animal that has a memory. Our noble friend the horse has a magnificent memory. It often outstrips that of his owner. I once took a raw colt out of the field and proceeded to break her for my own use. My father-in-law said I might have her if I would teach her to work. I was quite a boy then, and two “green ones” met about that time. The colt and I were getting along finely, and she followed me around quite docile until I attempted to lead her into a stable with a low door. She was holding her head pretty high, and, being unacquainted with doors, she gave her head a tremendous bump on the stout timber overhead. I had to make a great many explanations and do a lot of coaxing before she would consent to try to go in that door after that. She somehow got the idea that the top of the door “ducked down” and hit her a clip. Well, years afterward, when I had entirely forgotten the circumstances of her colthood, and attempted to lead her into that same door, and although she was comparatively old and steady then, she eyed that timber above the door with great suspicion and fear. Not only the large animals but bees remember experiences. Man may imitate nature in a great many things; but I imagine it will be many years before he understands the machinery of memory.

I am going still further, friends. Living animals have brains; they have an individuality. They plan and reason to some extent; but there is a queer feature about *plants* also that seems akin to memory. Last summer I gave the children a little talk about plants, at the children's-day Sunday-school in Northern Michigan. I showed them how to make plants from green cuttings; and to illustrate I held in my hand a green twig from a Red Astrachan apple-tree. I put some sand in a little flower-pot. Then I poured on some water and stuck the apple twig in the sand. Then I set a glass tumbler over the plant, pot and all. I told the children if the sand was kept wet just right, and the temperature just right, that twig would put out roots, and in due time make an apple-tree. Then to illustrate how it is that plants *remember* I spoke something as follows:

“Children, suppose I talk to this apple twig in the pot just as I talk to you, and tell it a lot of things I want done, and ask it not to forget any one of them. I will say to this little twig or miniature apple-tree, ‘Now, my young friend, I want you to grow up into a nice big apple-tree and bear apples.’ We will suppose the tree nods its head, meaning it is ready to do its part. ‘Now, little tree, I want you to remember to bear big handsome *red* apples.’ We will suppose the tree says, ‘All right.’ Then I will say again, ‘I want you to bear an *extra-early* apple.’ The tree nods its head. ‘And, finally, I want you to bear apples that are rather tart, because we want the first apples to make apple pies of.’ You boys all like apple pies, don't you? Well, I might tell this little apple-tree a lot of other things,

* Some years ago a banker said he had a note with my name on it. I told him I never signed that note. But he was so sure it was my signature that he was willing to bet \$1000 that I did sign it but had forgotten it. But I unhesitatingly declared positively that I never put my name on any note for that person. Some of my friends tried to persuade me that I was becoming forgetful in my old age, and that it really *was* my signature. Of course, I was right, and the young man finally confessed that he himself copied my signature. If it be true we can not *always* instantly recall what we *have* done, we can say very positively what we have *not* done, especially in the case of a forged signature.

and it would remember *them every time*. If we were talking to a boy he would probably forget a good part of my talk; but an apple-tree *never* forgets. The nurserymen who sell apple-trees not only forget, but they cheat and swindle folks. The apple-tree itself never forgets, never tells a lie, and never cheats nor swindles. It follows directions to the very dot. I picked this twig from a Red Astrachan apple-tree as I came to Sunday-school, and this little twig, insignificant as it may look and seem, will carry out the program exactly as I have directed. It will not blunder, and produce a white apple, and it will not blunder and produce a sweet one nor a late one nor a *sour* one. It will do just exactly as it is directed to do, and that is more than you boys, many of you, could do without forgetting, no matter how hard you tried. Now, how is it, children," and I held the little plant up in the air, "that there can be packed in this little twig, with only three or four green leaves, the ability to produce a great big Red Astrachan apple and not make a single mistake in the program?"* I have shown you some of the possibilities packed away out of sight in a little green twig; but let me tell you in closing that there are possibilities a thousand times greater, and of more importance to the world, packed away in the embryo life of every little boy and girl who sits before me. May God help you, each and all, to make a good use of these wonderful gifts he has bestowed on you, and bring *good and not evil* into this world of ours."



AMERICAN VARIETIES OF LETTUCE.

Did you ever! The Department of Agriculture, at Washington, has just put out a pretty good-sized book, pamphlet form, with 100 pages of reading-matter besides 27 pages of beautiful half-tone plates showing the different kinds of lettuce grown in America. As each plate contains two or more cuts of lettuce, there are something like 100 *varieties* illustrated.† What astonishes me is that there is demand in this nation of ours for so *many* different kinds of lettuce. We have space to mention only one—the lettuce that it was my pleasure to introduce to the world, and name—the Grand Rapids. This book tells us the Grand Rapids

*That one little twig would not only make a big apple-tree, but it would produce an orchard of a hundred trees or more; and the ability, "memory," or what else you may call it, to do this *unerringly* is packed away *somewhere* in that little twig; and with some plants, even a little bit of one of the leaves, would answer, in the hands of an expert florist. The begonia, for instance, is propagated by cutting a leaf into many little bits. Each leaf in the cutting produces a little plant.

†American seedsmen recognize 444 varieties, and Prof. Tracy decides that of these at least 107 are distinct.

is now listed by 164 seedsmen. Here is what it has to say about it:

Probably one of the ten most largely grown varieties of the United States. The favorite for forcing in the West and other markets where hothouse lettuce is sold by weight and whose markets accept a bunching variety. It has largely replaced Black-seeded Simpson for this purpose. At Washington it does not succeed well outdoors, and is not recommended further South than this latitude. More easily grown in greenhouses than almost any other variety. Stands a great deal of neglect in watering and ventilation. A splendid shipper, and with many gardeners by far the best and most profitable sort for growing under glass. One of the coarser varieties, good in quality when grown outdoors, but becoming more tender and sweet when grown in greenhouses. More like Black-seeded Simpson than any other, not only in appearance, but also in usefulness and value. Its fringed leaves and general habit are most like Boston Curled. The young plants are hardly distinguishable from Hanson and Black-seeded Simpson. Grown in greenhouses the variety is very tall and upright in habit, not as described in the above notes, which apply only to outdoor specimens.

I hardly need tell you that the advent of the Grand Rapids lettuce introduced to the world a great rural industry, and one that was especially a boon to market-gardeners and florists as well, inasmuch as it is an industry that can be very easily managed in the winter time when all other garden-stuff is frozen up outdoors. There are just now *acres* of greenhouses right here in Ohio devoted to the growing of Grand Rapids lettuce. My impression is, the Department of Agriculture forwards this book on receipt of 10 cents; but I do not find the price on the bulletin. It was issued Dec. 23, 1904. If you want it, write to the United States Department of Agriculture, Washington, D. C. Do not write to *us*, for that will just make additional work.

AN APPLE STORY, AND SOMETHING ABOUT A LOCOMOTIVE ENGINEER AND HIS HIGH-PRESSURE GARDENING.

I read your articles with much pleasure, and note that, like myself, you are a lover of good apples. Thinking you would like to try some others I send you three of my favorite kinds. The bright red are McIntosh Red. The dark red are American Beauty, and the others are Palmer Greenings. The McIntosh is all right to eat now, but the others are not ripe enough. I am not an apple-grower on a large scale, but I grow a few of the best. I do my own grafting, etc. I am a locomotive engineer, but I spend most of my spare time among my flowers and plants. I keep bees. I took \$43.75 worth of comb honey from two hives last summer. I grow rhubarb in the cellar all winter near the furnace. I have just put in seven roots. I grow it in the dark, you know. I get about ten pounds to a root. It is fine when the snow is two or three feet deep. I have only one-half acre of land, and two or three kinds of apples on a tree. I have to economize the room, but I enjoy it just the same. F. P. BRIGGS.

Ayer, Mass., Nov. 30.

Soon after the above, came a box by express containing a dozen or more beautiful apples. We have the McIntosh Red in our own orchard—at least the Pomological Department at Washington pronounced them so. Ours are a beautiful bright red, but they are rather small, and one would almost call them a sweet apple, while the McIntosh sent by friend Briggs was of good size, and neither sweet nor sour. But at the time they were received I pronounced it about the finest apple I ever tasted. Of course, I have said this a great many times, but you may

make allowance. The others were too hard for use; but by the middle of January I pronounced the *Palmer Greening* about the finest apple I ever tasted; and while enjoying them, I inwardly thanked God for having placed it within the power of man to produce such beautiful apples. The American Beauty is still too hard to test fairly. I sent our good friend GLEANINGS a year to pay him for his trouble, and especially prepaying the express charges from Massachusetts; and in reply he sends some more in regard to his high-pressure gardening around his little home (*to be given in our next issue*), which I am sure will interest a great number of our readers. Such homes as the ones he describes are more to be desired than great riches or almost any thing else in this world.

INOCULATION OF SOIL FOR LEGUMES; OR,
CARRYING FERTILIZER IN YOUR "VEST
POCKET" SUFFICIENT TO IMPROVE
GREATLY AN ACRE OF
GROUND.

The Department of Agriculture has issued a bulletin (No. 71) in regard to the above matter. In fact, the bulletin in my hand is dated Jan. 23, 1905. It came through the mails to-day, Jan. 26. This bulletin contains 72 pages of reading-matter and 9 of illustrations. During the past few years the Department of Agriculture has sent out about 12,500 packages of artificial cultures for preparing the seed of all the clovers and legumes so they will produce the nitrogen nodules we have several times talked about. These wonderful bacteria are sent in a little bit of bacteria-infected cotton. This cotton will hold millions of the little plants, if that is what they should be called. In order to give the bacteria a good chance you take a gallon of clean rain water and dissolve in it the chemical sent along with the bacteria. This is to cleanse the water from any bacteria already existing in it. The magic piece of cotton is then dropped into the solution. After 24 hours, add package 23; and in 24 hours more, if the liquid is kept at a warm temperature, but not greater than blood heat (97 degrees), the liquid will have assumed a cloudy or milky appearance, indicating that the bacteria have gone all through it, something as yeast goes through a suitable liquid. Now, your clover seed, beans, peas, or whatever it is, is to be thoroughly moistened with this liquid; then dried, and planted in the usual manner. The Department has already received over 2500 reports from all over the United States; and almost every one testifies that the legumes were not only greatly superior in luxuriance, but that the peculiar nitrogen nodules were found in abundance on the treated field, and almost none at all on the untreated. The plates in the back part of the bulletin make this whole matter exceedingly plain. Experiments have already been made with alfalfa and other clovers; cow peas, soy beans, velvet bean, garden peas, and sweet peas; and great benefit has accrued in almost every case where the bacteria were used accord-

ing to directions. For either Bulletin 71 or inoculating material, address United States Department of Agriculture, Washington, D. C.

Below is something from Prof. Thorne, in answer to an inquiry from myself in regard to the nitro-culture that is being extensively advertised.

OHIO AGRICULTURAL EXPERIMENT STATION, }
WOOSTER, OHIO, Jan. 17, 1905. }

Mr. A. I. Root:—Regarding the nitro-culture I will say that there is undoubtedly some foundation for the expectation that these cultures would sometimes be serviceable. The principle upon which their usefulness depends is that many or most of the leguminous plants have associated with them a species of bacterium which forms the nodules which we see upon their roots, and through which the free nitrogen of the air which permeates the soil about the roots is converted into forms upon which the plants may feed. These bacteria are of different species for the different species of plants, so that the claim of the nitro-culture people, that they have a special bacterium for each different legume, has a scientific foundation for its basis.

To illustrate how these bacteria work, the soy beans which are growing at the Station, when planted on land which has never before grown soy beans, will produce almost no nodules on the roots the first season; but when planted the second season on the same land, practically every plant will carry an abundance of these nodules. The soy bean, you know, is a new plant to Ohio agriculture, and so is alfalfa. These plants may no doubt be benefited by either inoculating the seed or the soil. The same principle applies generally. Clover, however, has been grown here since the beginning of agriculture in Ohio, and we would not expect to find any soil which is not already infected with the bacteria peculiar to the clover-plant. Dr. Moore, of the Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C., claims to have developed a system of inoculating the seeds of various legumes with the bacteria peculiar to the different species, so that nodules will be formed the first season of growth. In our experiments thus far we have not been very successful along this line, but we are still using Dr. Moore's preparation and we are also using those advertised by the nitro-culture company.

Our suggestion to the Ohio farmers would be to let the Experiment Station study this matter a year before they invest much money in it, especially as the genuine organisms may be procured free of cost on application to the National Department of Agriculture.

CHAS. E. THORNE.

Wants and Exchange.

Notices will be inserted under this head at 15 cts. per line. Advertisements intended for this department should not exceed five lines, and you must SAY you want your advertisement in this department or we will not be responsible for errors. You can have the notice as many lines as you like; but all over five lines will cost you according to our regular rates. This department is intended only for bona-fide exchanges. Exchanges for cash or for price lists, or notices offering articles for sale, will be charged our regular rates of 20 cts. per line, and they will be put in other departments. We can not be responsible for dissatisfaction arising from these "swaps."

WANTED.—To exchange ladies' \$60 bicycle for type-writer. Lock Box 4, East Calais, Vt.

WANTED.—To exchange incubator and homer pigeons for honey. G. ROUTZAHN, Biglerville, Pa.

WANTED.—To exchange dental outfit, consisting of chair, engine, and lathe; want bees and supplies. WM. C. C. BALL, Plainfield, Conn.

WANTED.—To exchange 8-frame hives, extractor, and uncapping-can, for honey. Root's goods. O. H. HYATT, Shenandoah, Iowa.

WANTED.—Two Dadant uncapping-cans. Must be in good condition. F. A. GRAY, Redwood Falls, Minn.

WANTED.—500 queens the coming season; quote prices, state strain and delivery. Address THE ROCKY MOUNTAIN BEE CO., Berthoud, Col.